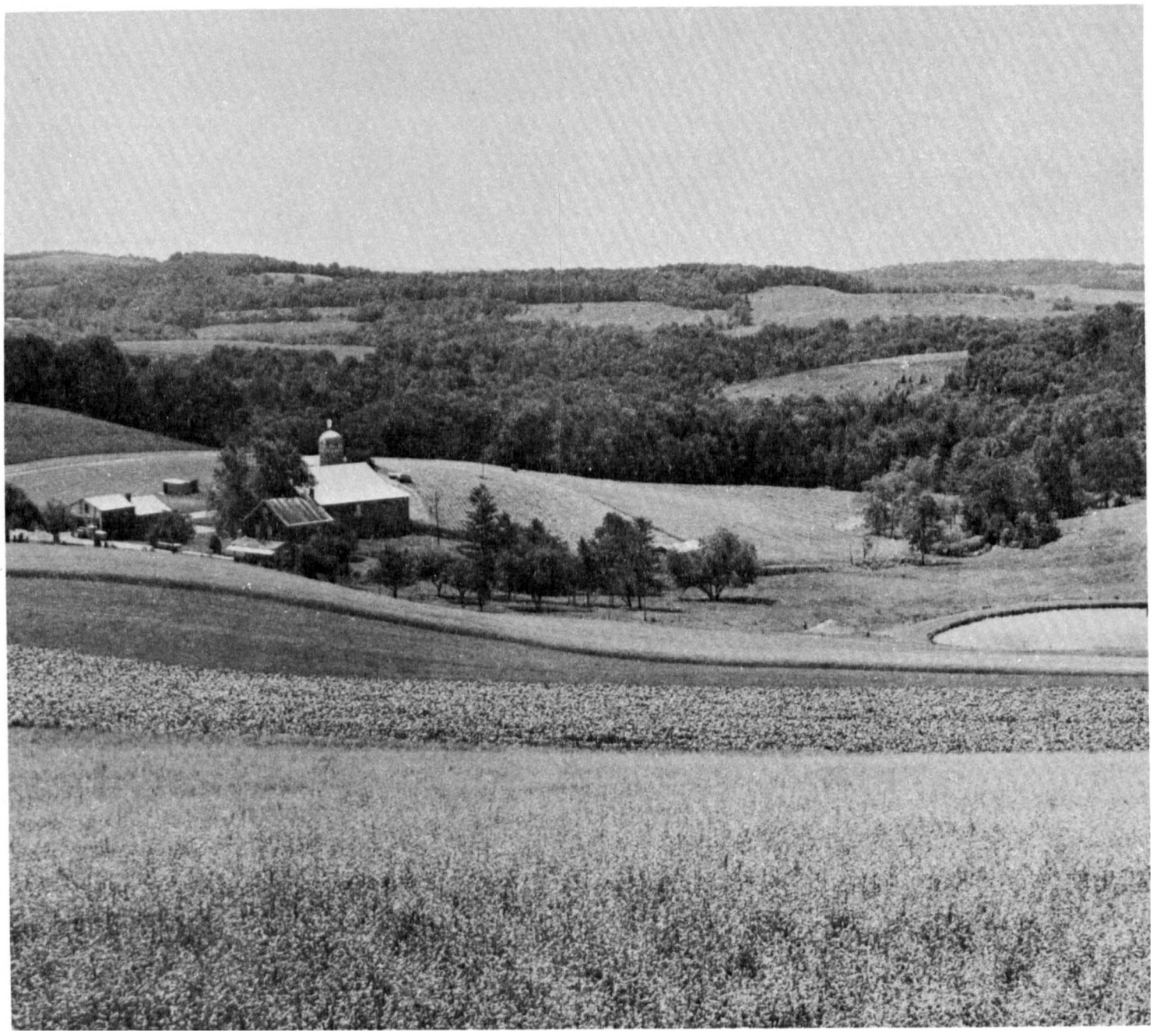
United States Department of Agriculture

Soil Conservation Service

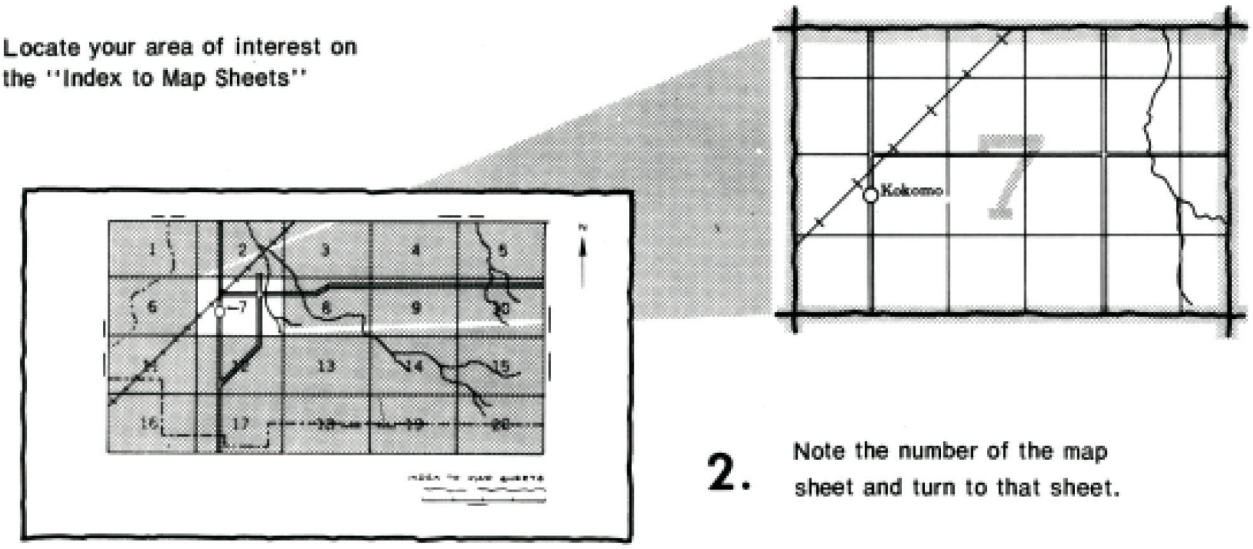
In Cooperation with
The Pennsylvania State University College of Agriculture and Pennsylvania Department of Environmental Resources State Conservation Commission

Soil Survey of Cambria County Pennsylvania



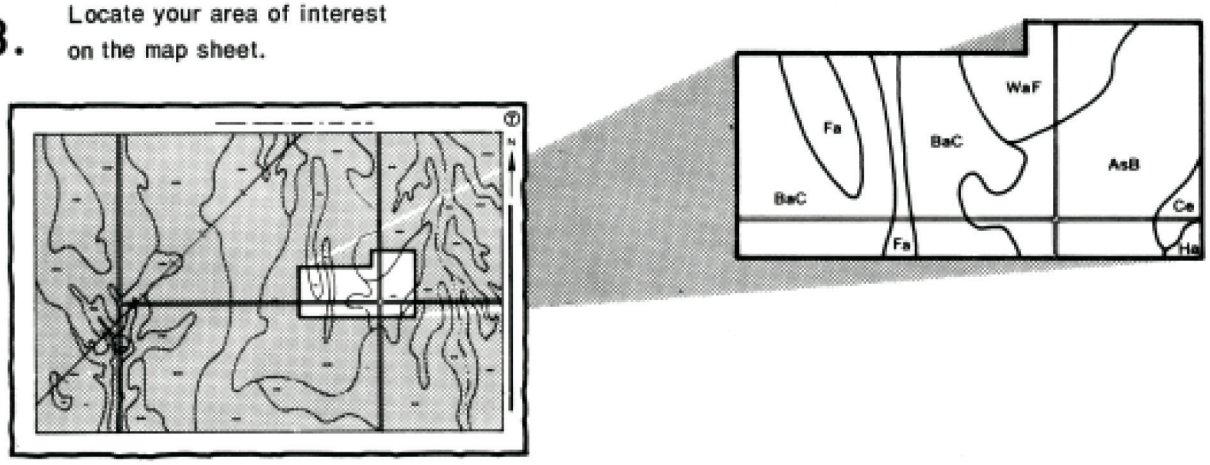
HOW TO USE

1. Locate your area of interest on the "Index to Map Sheets"

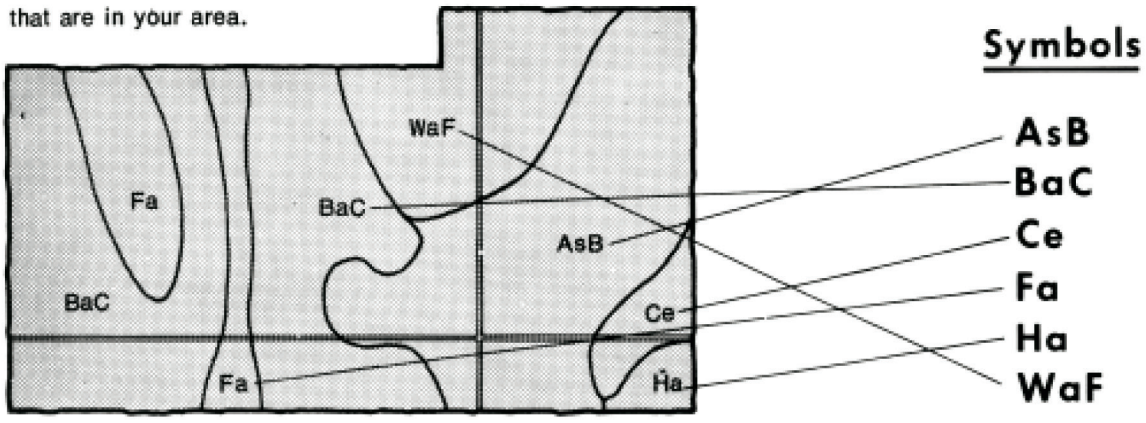


2. Note the number of the map sheet and turn to that sheet.

3. Locate your area of interest on the map sheet.

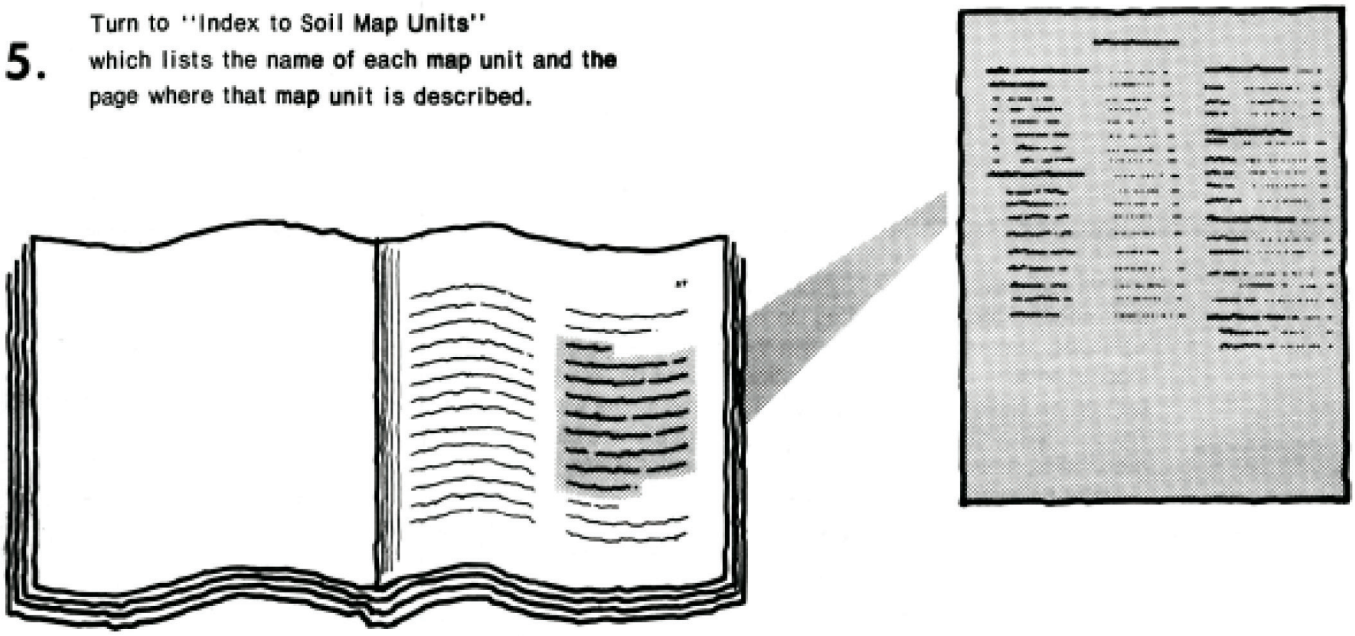


4. List the map unit symbols that are in your area.

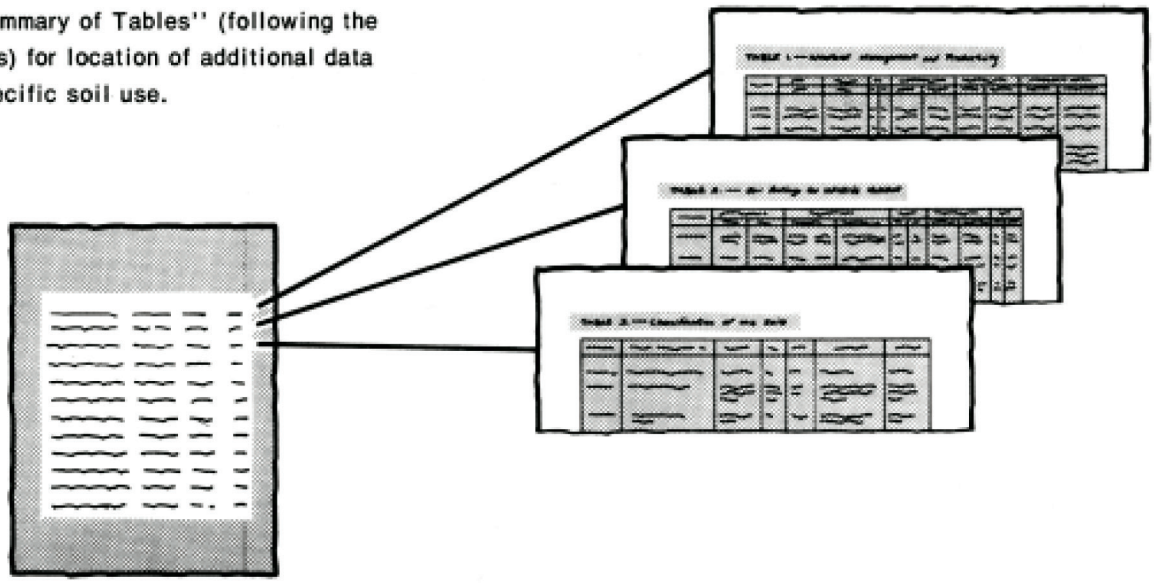


THIS SOIL SURVEY

5. Turn to "Index to Soil Map Units" which lists the name of each map unit and the page where that map unit is described.



6. See "Summary of Tables" (following the Contents) for location of additional data on a specific soil use.



7. Consult "Contents" for parts of the publication that will meet your specific needs. This survey contains useful information for farmers or ranchers, foresters or agronomists; for planners, community decision makers, engineers, developers, builders, or homebuyers; for conservationists, recreationists, teachers, or students; to specialists in wildlife management, waste disposal, or pollution control.

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other federal agencies, state agencies including the Agricultural Experiment Stations, and local agencies. The Soil Conservation Service has leadership for the federal part of the National Cooperative Soil Survey. In line with Department of Agriculture policies, benefits of this program are available to all, regardless of race, color, national origin, sex, religion, marital status, or age.

Major fieldwork for this soil survey was performed in the period 1967-1976. Soil names and descriptions were approved in 1978. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1978. This survey was made cooperatively by the Soil Conservation Service, The Pennsylvania State University, College of Agriculture, and the Pennsylvania Department of Environmental Resources, State Conservation Commission. The survey is part of the technical assistance furnished to the Cambria Conservation District. Financial assistance for the survey was provided by the Cambria County Board of Commissioners and the U.S. Department of Housing and Urban Development.

Soil maps in this survey may be copied without permission. Enlargement of these maps, however, could cause misunderstanding of the detail of mapping. If enlarged, maps do not show the small areas of contrasting soils that could have been shown at a larger scale.

Cover: A typical area of the Gilpin-Ernest-Wharton soil association.

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soil series

Issued September 1985

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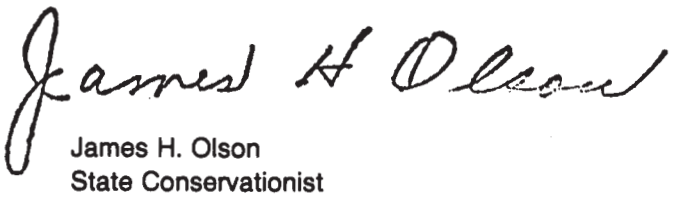
foreword

This soil survey contains information that can be used in land-planning programs in Cambria County. It contains predictions of soil behavior for selected land uses. The survey also highlights limitations and hazards inherent in the soil, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

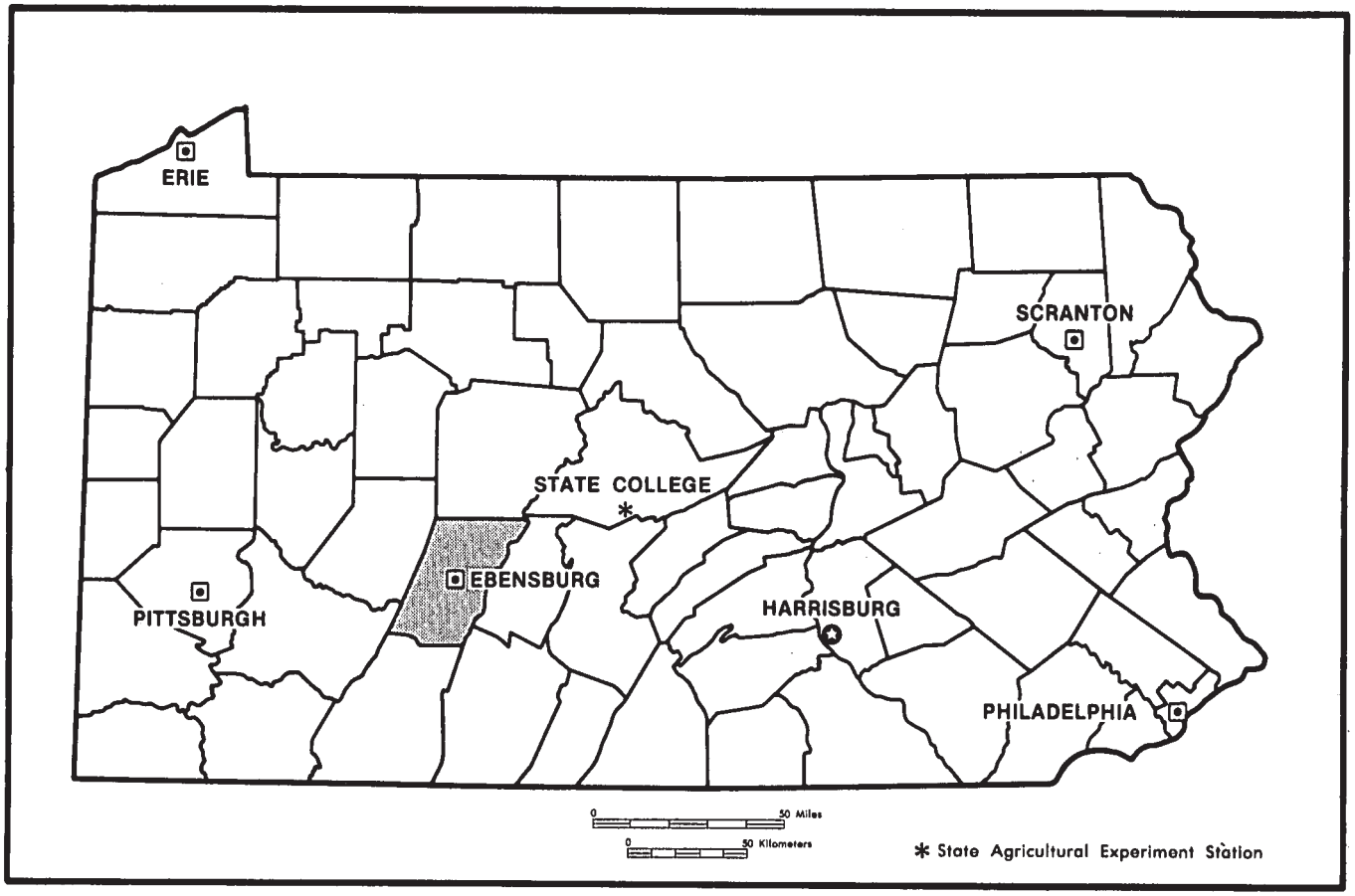
This soil survey is designed for many different users. Farmers, ranchers, foresters, and agronomists can use it to evaluate the potential of the soil and the management needed for maximum food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use the survey to plan land use, select sites for construction, and identify special practices needed to insure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the survey to help them understand, protect, and enhance the environment.

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are shallow to bedrock. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

These and many other soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map. The location of each soil is shown on the detailed soil maps. Each soil in the survey area is described. Information on specific uses is given for each soil. Help in using this publication and additional information are available at the local office of the Soil Conservation Service or the Cooperative Extension Service.



James H. Olson
State Conservationist
Soil Conservation Service



Location of Cambria County in Pennsylvania.

soil survey of
Cambria County, Pennsylvania

By Dr. William H. Farley, Soil Conservation Service

Fieldwork by David Yost, David Belz, and Daniel Seibert, Soil Conservation Service

United States Department of Agriculture, Soil Conservation Service,
in cooperation with The Pennsylvania State University, College of Agriculture,
and the Pennsylvania Department of Environmental Resources,
State Conservation Commission

CAMBRIA COUNTY is in the southwestern part of Pennsylvania. The county was officially founded in 1804, making it the 41st county in Pennsylvania. It has an area of 695 square miles, or 444,800 acres. This acreage is about 65 percent forested and 20 percent farmland. The remaining 15 percent is in urban, residential, and industrial uses.

Census data in 1970 show a population of 186,785 for the county. The largest city is Johnstown, with a population of 42,476. Ebensburg is the county seat and has a population of 4,318. Other major communities in the county are Nanty Glo, Cresson, Loretto, and Barnesboro. The Conemaugh River is the major source of water for the communities in the county. The main highways are U.S. Routes 219, 22, and 422 and Pennsylvania Routes 53, 36, 271, and 46.

The major sources of employment in the county are steel manufacturing, agriculture, coal mining, garment manufacturing, and lumber manufacturing. In 1976, nearly 8 million tons of coal was mined in the county. Of this amount, about 5 million tons came from deep mines, 2 million tons from strip mines, and 1 million tons from refuse production.

climate

Prepared by the National Climatic Center, Asheville, North Carolina.

Winters are cold and snowy at high elevations in Cambria County. The valleys are also frequently cold, but intermittent thaws preclude a long-lasting snow cover. Summers are fairly warm on mountain slopes and are very warm in the valleys. Rainfall is evenly distributed during the year, but it is appreciably heavier on the windward, west-facing slopes than in the valleys. Normal annual precipitation is adequate for all crops, although summer temperature and growing season length are inadequate at some higher elevations.

Table 1 gives data on temperature and precipitation for the survey area as recorded at Ebensburg in the period 1964 to 1975. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

In winter the average temperature is 27 degrees F, and the average daily minimum temperature is 17 degrees. The lowest temperature on record, which occurred at Ebensburg on January 29, 1966, is -19 degrees. In summer the average temperature is 66 degrees, and the average daily maximum temperature is 79 degrees. The highest recorded temperature, which occurred at Ebensburg on July 3, 1966, is 99 degrees.

Growing degree days are shown in table 1. They are equivalent to heat units. During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (40 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

The total annual precipitation is 49 inches. Of this, 27 inches, or 55 percent, usually falls in April through September, which includes the growing season for most

crops. In 2 years out of 10, the rainfall in April through September is less than 23 inches. The heaviest 1-day rainfall during the period of record was 3.65 inches at Ebensburg on September 29, 1967. Thunderstorms occur on about 40 days each year, and most occur in summer.

Average seasonal snowfall is 120 inches. The greatest snow depth at any one time during the period of record was 45 inches. On an average of 96 days, at least 1 inch of snow is on the ground. The number of such days varies greatly from year to year.

The average relative humidity in midafternoon is about 60 percent. Humidity is higher at night, and the average at dawn is about 80 percent. The sun shines 60 percent of the time possible in summer and 35 percent in winter. The prevailing wind is from the west-southwest. Average windspeed is highest, 11 miles per hour, in March.

how this survey was made

Soil scientists made this survey to learn what soils are in the survey area, where they are, and how they can be used. They observed the steepness, length, and shape of slopes; the size of streams and the general pattern of drainage; the kinds of native plants or crops; and the kinds of rock. They dug many holes to study soil profiles. A profile is the sequence of natural layers, or horizons, in a soil. It extends from the surface down into the parent material, which has been changed very little by leaching or by plant roots.

The soil scientists recorded the characteristics of the profiles they studied and compared those profiles with others in nearby counties and in more distant places. They classified and named the soils according to nationwide uniform procedures. They drew the boundaries of the soils on aerial photographs. These photographs show trees, buildings, fields, roads, and other details that help in drawing boundaries accurately. The soil maps at the back of this publication were prepared from aerial photographs.

The areas shown on a soil map are called map units. Most map units are made up of one kind of soil. Some are made up of two or more kinds. The map units in this survey area are described under "Detailed soil map units."

While a soil survey is in progress, samples of some soils are taken for laboratory measurements and for engineering tests. All soils are field tested to determine their characteristics. Interpretations of those characteristics may be modified during the survey. Data are assembled from other sources, such as test results, records, field experience, and state and local specialists. For example, data on crop yields under defined management are assembled from farm records and from field or plot experiments on the same kinds of soil.

But only part of a soil survey is done when the soils have been named, described, interpreted, and delineated on aerial photographs and when the laboratory data and other data have been assembled. The mass of detailed information then needs to be organized so that it can be used by farmers and woodland managers, engineers, planners, developers and builders, home buyers, and others.

Cambria County is adjacent to Indiana and Westmoreland Counties, which have modern published surveys. Soil mapping delineations on field sheets and on general soil maps have been joined along the mutual boundaries. In some places, delineated areas on either side of the boundaries do not have identical map unit names because of difference in design and composition of the map units. In most areas, similar soils are joined; however, along the Westmoreland County line some dissimilar soils are joined because of legend design, detail of mapping in mountainous areas, and improvements in the classification of soils, particularly modification of refinements in soil series concepts.

general soil map units

The general soil map at the back of this publication shows broad areas that have a distinctive pattern of soils, relief, and drainage. Each association on the general soil map is a unique natural landscape. Typically, an association consists of one or more major soils and some minor soils. It is named for the major soils. The soils making up one association can occur in other assocations but in a different pattern.

The general soil map can be used to compare the suitability of large areas for general land uses. Areas of suitable soils can be identified on the map. Likewise, areas where the soils are not suitable can be identified.

Because of its small scale, the map is not suitable for planning the management of a farm or field or for selecting a site for a road or building or other structure. The soils in any one association differ from place to place in slope, depth, drainage, and other characteristics that affect management.

The soils in the survey area vary widely in their potential for major land uses.

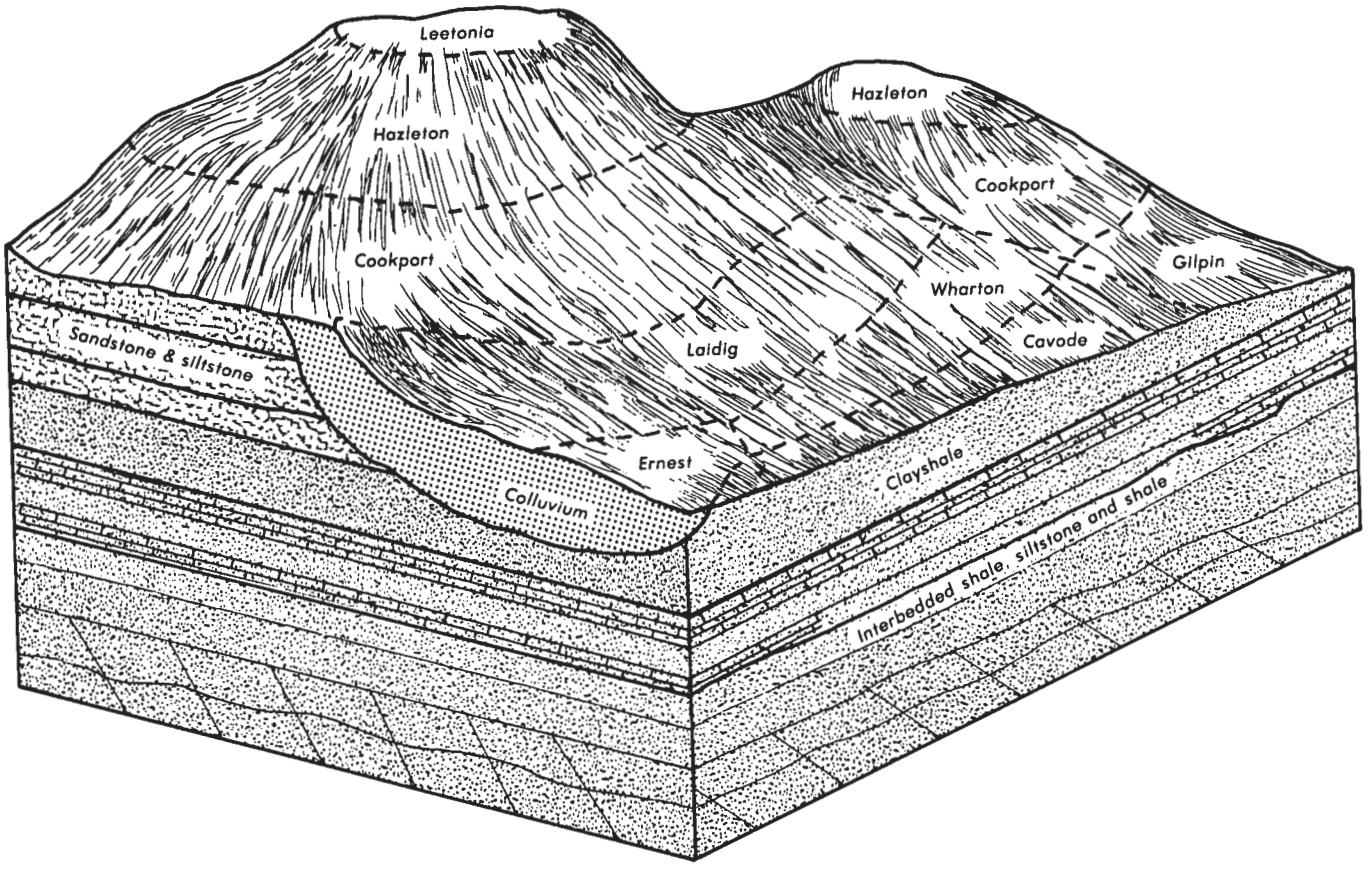


Figure 1.—Typical pattern of soils and parent material in the Cookport-Hazleton-Laidig association.

soil descriptions

1. Cookport-Hazleton-Laidig association

Deep, nearly level to steep, moderately well drained and well drained soils that formed in residual and colluvial material; on uplands

This association consists of soils on broad mountains and broad to narrow ridges that have colluvial side slopes dissected by drainageways (fig. 1). The association makes up about 45 percent of the county. It is about 30 percent Cookport soils, 20 percent Hazleton soils, 20 percent Laidig soils, and 30 percent soils of minor extent.

The Cookport soils are moderately well drained and nearly level to moderately steep. They have a moderately slowly permeable and slowly permeable layer at a depth of 16 to 22 inches. The Cookport soils formed in residuum weathered from acid sandstone and some siltstone conglomerate and shale and are generally at lower areas on mountains and ridges.

The Hazleton soils are well drained and gently sloping to moderately steep. They formed in residuum weathered from acid sandstone and conglomerate and are on the upper parts of mountains and ridges.

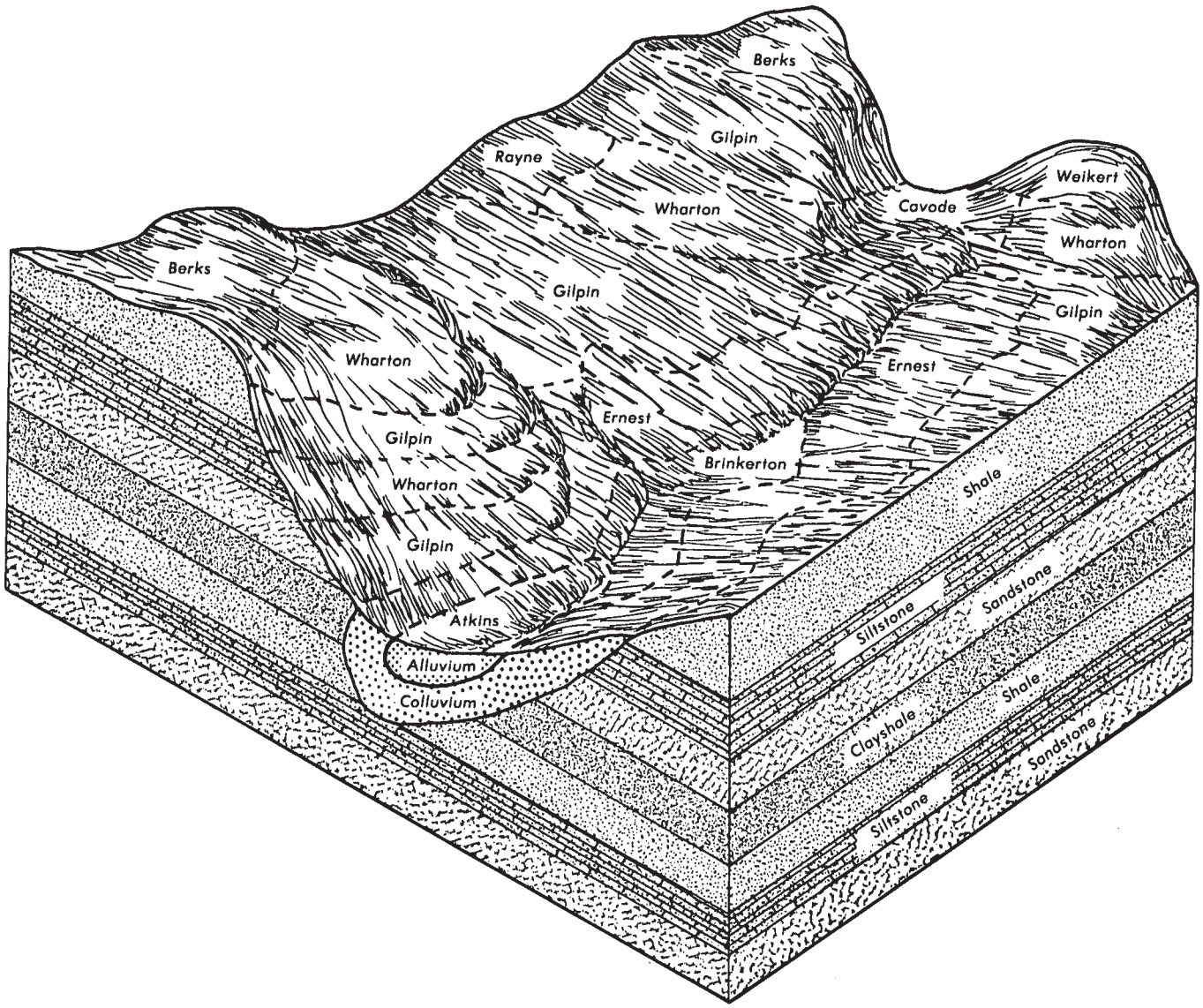


Figure 2.—Typical pattern of soils and parent material in the Gilpin-Ernest-Wharton association.

Figure 3.—A typical landscape in the Gilpin-Ernest-Wharton association.

The Laidig soils are well drained and nearly level to steep. They have a moderately slowly permeable layer at a depth of 30 to 50 inches. The Laidig soils formed in colluvium derived from acid sandstone, shale, and siltstone and are generally on the sides of mountains and ridges.

The minor soils on uplands in this association are well drained Weikert, Gilpin, and Rayne soils; well drained to excessively drained Leetonia soils; moderately well drained Wharton and Ernest soils; somewhat poorly drained Cavode soils; and poorly drained Nolo soils. The minor soils on flood plains are moderately well drained Philo soils and poorly drained Atkins soils.

Most areas of this association are in woodland. Some areas are used for crops and pasture, and a few small areas are in urban and industrial uses. The main limitations for most uses are stoniness, slope, erosion, and a seasonal high water table.

2. Gilpin-Ernest-Wharton association

Moderately deep and deep, gently sloping to moderately steep, well drained and moderately well drained soils that formed in residual and colluvial material; on uplands

This association consists of areas of soils on moderately broad to narrow ridges and hills that are dissected by drainageways (fig. 2). The association makes up about 39 percent of the county. It is about 30 percent Gilpin soils, 13 percent Ernest soils, 12 percent Wharton soils, and 45 percent soils of minor extent.

The Gilpin soils are moderately deep and are well drained. They formed in residuum from acid shale and sandstone. The Gilpin soils are on the tops and steeper side slopes of hills and ridges.

The Ernest soils are deep and moderately well drained. They have a slowly permeable layer at a depth

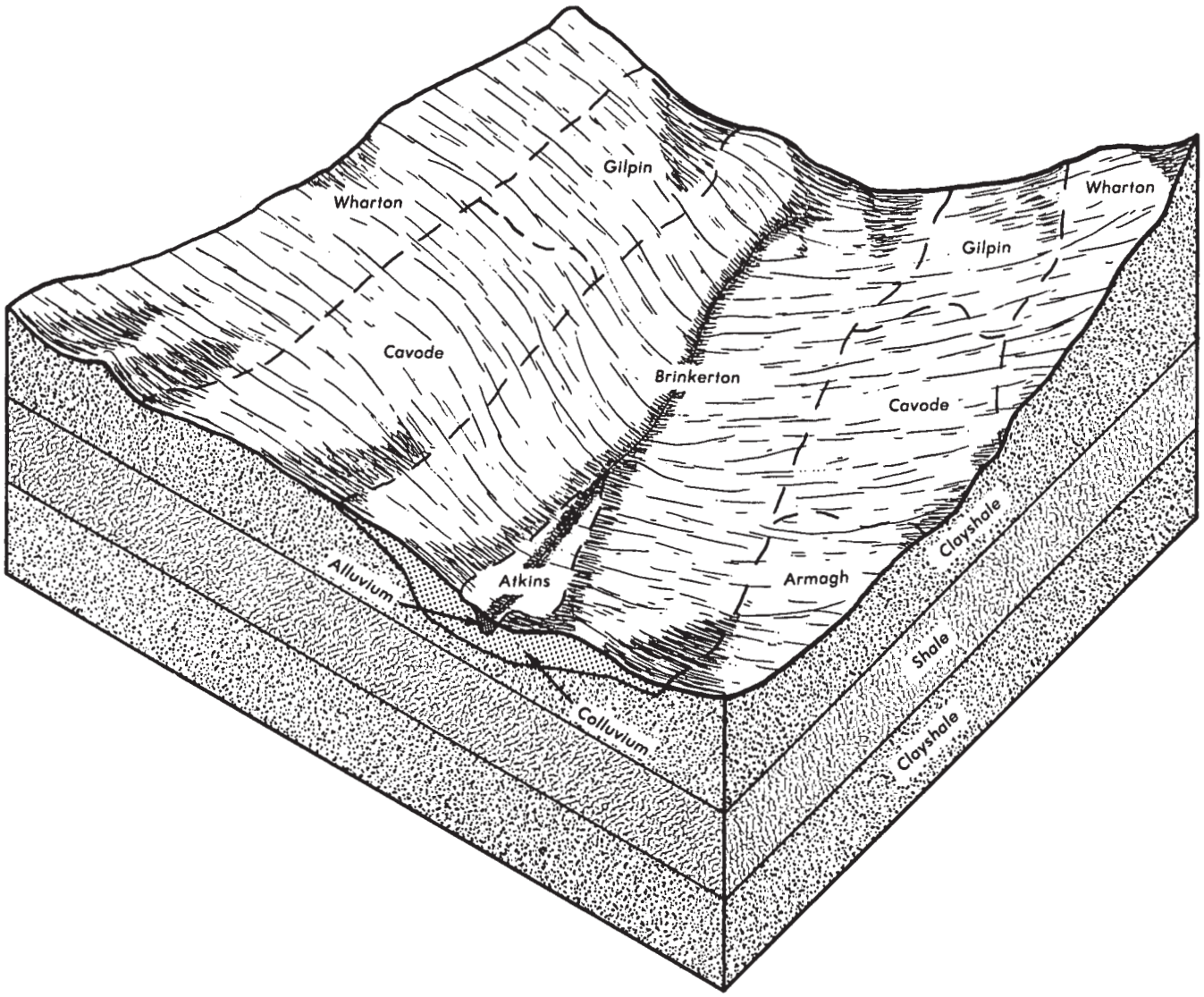


Figure 4.—Typical pattern of soils and parent material in the Brinkerton-Wharton-Cavode association.

of 20 to 30 inches. They formed in colluvium from acid shale, siltstone, and sandstone. The Ernest soils are on the foot slopes of hills and ridges and are in concave areas on ridgetops.

The Wharton soils are deep and moderately well drained. They formed in residuum from acid clay shale and siltstone. The Wharton soils are on the tops and steeper side slopes of hills and ridges.

The minor soils on uplands in this association are well drained Weikert, Berks, and Rayne soils; moderately well drained and somewhat poorly drained Blairton soils; somewhat poorly drained Cavode soils; and poorly drained Brinkerton soils. The minor soils on flood plains are poorly drained Atkins soils.

Most areas of this association are in cropland and woodland (fig. 3). Some areas are used for urban and industrial development. The main limitations for most uses are moderate depth to bedrock, a seasonal high water table, slow permeability, and slope.

3. Brinkerton-Wharton-Cavode association

Deep, nearly level to moderately steep, poorly drained to moderately well drained soils that formed in colluvial and residual material; on uplands

This association consists of areas of soils on broad ridges that are dissected by drainageways (fig. 4). The association makes up about 12 percent of the county. It

is about 42 percent Brinkerton soils, 20 percent Wharton soils, 18 percent Cavode soils, and 20 percent soils of minor extent.

The Brinkerton soils are poorly drained and nearly level to gently sloping. They have a slowly permeable layer at a depth of 15 to 30 inches. The Brinkerton soils formed in colluvium derived from shale and sandstone. They are on slopes at the base of hills and ridges.

The Wharton soils are moderately well drained and gently sloping to moderately steep. They formed in residuum derived from acid gray clay shale. The Wharton soils are on the tops and side slopes of hills and ridges.

The Cavode soils are somewhat poorly drained and gently sloping to moderately steep. They formed in residuum derived from acid gray clay shale. The Cavode soils are on the tops and side slopes of hills and ridges.

The minor soils on uplands in this association are well drained Gilpin, Rayne, and Weikert soils; moderately well drained Ernest soils; and poorly drained Armagh soils. The minor soils on flood plains are moderately well drained Philo soils and poorly drained Atkins soils.

Most areas of this association are in crops, hay, and pasture. A few small areas are used for urban and industrial development. The main limitations for most uses are a seasonal high water table, slow permeability, and erosion.

4. Atkins-Philo association

Deep, nearly level, poorly drained and moderately well drained soils that formed in alluvial material; on flood plains

This association consists of soils on narrow to broad flood plains along major streams and tributaries. The association makes up about 4 percent of the county. It is about 50 percent Atkins soils, 10 percent Philo soils, and 40 percent soils of minor extent.

The Atkins soils are poorly drained. They formed in alluvium washed from sandstone- and shale-derived soils. The Atkins soils are on lower parts of flood plains.

The Philo soils are moderately well drained. They formed in alluvium washed from sandstone- and siltstone-derived soils. They are on the middle and higher parts of flood plains.

The minor soils on flood plains in this association are well drained Pope soils. The minor soils on uplands are well drained Berks and Rayne soils, moderately well drained Wharton soils, somewhat poorly drained Cavode soils, and poorly drained Brinkerton soils.

Most areas of this association are in pasture, woodland, and urban uses. A large acreage of the association is idle. The main limitations for most uses are a seasonal high water table and flooding.

detailed soil map units

The map units on the detailed soil maps at the back of this survey represent the soils in the survey area. The map unit descriptions in this section, along with the soil maps, can be used to determine the suitability and potential of a soil for specific uses. They also can be used to plan the management needed for those uses. More information on each map unit, or soil, is given under "Use and management of the soils."

Each map unit on the detailed soil maps represents an area on the landscape and consists of one or more soils for which the unit is named.

A symbol identifying the soil precedes the map unit name in the soil descriptions. Each description includes general facts about the soil, a brief description of the soil profile, and a listing of the principal hazards and limitations to be considered in planning management.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer or of the underlying material, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer or of the underlying material. They also can differ in slope, stoniness, salinity, wetness, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Cavode silt loam, 0 to 3 percent slopes, is one of several phases in the Cavode series.

Some map units are made up of two or more major soils. These map units are called soil complexes or undifferentiated groups.

A *soil complex* consists of two or more soils in such an intricate pattern or in such small areas that they cannot be shown separately on the soil maps. The pattern and proportion of the soils are somewhat similar in all areas. Gilpin-Rayne silt loams, 8 to 15 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils in a mapped area are not uniform. An area can be made up of only one of the major soils, or it can be made up of all of them. Cookport and Ernest soils, 3 to 8 percent slopes, is an undifferentiated group in this survey area.

Most map units include small scattered areas of soils other than those for which the map unit is named. Some of these included soils have properties that differ substantially from those of the major soil or soils. Such differences could significantly affect use and management of the soils in the map unit. The included soils are identified in each map unit description. Some small areas of strongly contrasting soils are identified by a special symbol on the soil maps.

This survey includes *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Dumps, mine, is an example. Miscellaneous areas are shown on the soil maps. Some that are too small to be shown are identified by a special symbol on the soil maps.

Table 4 gives the acreage and proportionate extent of each map unit. Other tables (see "Summary of tables") give properties of the soils and the limitations, capabilities, and potentials for many uses. The Glossary defines many of the terms used in describing the soils.

soil descriptions

AbB—Albrights silt loam, 3 to 8 percent slopes. This soil is gently sloping, deep, and moderately well drained and somewhat poorly drained. It is on concave hillsides and benches. The areas are irregular in shape and range from 5 to 80 acres.

Typically, the surface layer is dark brown silt loam 3 inches thick. The subsoil extends to a depth of 50 inches. The upper 9 inches is reddish brown, friable channery silt loam. The next 19 inches is reddish brown, firm channery silty clay loam that is mottled in the lower part. The lower 19 inches is mottled, reddish brown, firm and brittle channery loam. The substratum is mottled, red, firm channery loam to a depth of 80 inches or more.

Included with this soil in mapping are a few areas of Hazleton, Laidig, and Cookport soils.

This Albrights soil has moderately slow permeability and moderate available water capacity. Surface runoff is medium. In unlimed areas reaction ranges from extremely acid to strongly acid in the surface layer and upper part of the subsoil. It is very strongly acid to slightly acid in the lower part of the subsoil and in the

substratum. A seasonal high water table is at a depth of 12 to 36 inches.

Most areas of this soil are in woodland. Some small areas are used for farming, building sites, and recreation.

Where this soil is used for cultivated crops, the hazard of erosion is moderate. Crops respond well to fertilizers. Minimum tillage, diversions, grassed waterways, and stripcropping help to reduce runoff and control erosion. Growing cover crops, keeping crop residue on the soil, and including hay in the cropping system are practices that maintain organic matter content and tilth.

The use of proper stocking rates to maintain key plant species and the rotation of pastures are the chief pasture management needs on this soil. Grazing of pasture when the soil is too wet causes surface compaction, excessive runoff, and poor tilth. Optimum production of pasture grasses requires maintenance of fertility through periodic applications of nutrients.

This soil is suitable for trees. Machine planting is practical in the large areas.

The moderately slow permeability of this soil and a seasonal high water table limit the soil for most nonfarm uses, especially for onsite waste disposal.

The capability subclass is IIe; woodland ordination symbol 3o.

AbC—Albrights silt loam, 8 to 15 percent slopes. This soil is sloping, deep, and moderately well drained and somewhat poorly drained. It is on ridges and concave hillsides. The areas are irregular in shape and range from 5 to 80 acres.

Typically, the surface layer is dark brown silt loam 3 inches thick. The subsoil extends to a depth of 50 inches. The upper 9 inches is reddish brown, friable channery silt loam. The next 19 inches is reddish brown, firm channery silty clay loam that is mottled in the lower part. The lower 19 inches is mottled, reddish brown, firm and brittle channery loam. The substratum is mottled, red, firm channery loam to a depth of 80 inches or more.

Included with this soil in mapping are a few areas of Hazleton, Laidig, and Cookport soils.

This Albrights soil has moderately slow permeability and moderate available water capacity. Surface runoff is rapid. In unlimed areas reaction ranges from extremely acid to strongly acid in the surface layer and upper part of the subsoil. It is very strongly acid to slightly acid in the lower part of the subsoil and in the substratum. A seasonal high water table is at a depth of 12 to 36 inches.

Most areas of this soil are in woodland. Some small areas are used for farming, building sites, and recreation.

Where this soil is used for cultivated crops, the hazard of erosion is severe. Crops respond well to fertilizers. Growing cover crops, keeping crop residue on the soil, and including hay in the cropping system are practices that maintain organic matter content and tilth. Minimum tillage, stripcropping, use of winter cover crops, diversions, and grassed waterways help to reduce runoff and control erosion.

The use of proper stocking rates to maintain key plant species and the rotation of pastures are the chief pasture management needs on this soil. Grazing when the soil is too wet causes surface compaction, excessive runoff, and poor tilth. Optimum production of pasture grasses requires maintenance of fertility through periodic applications of nutrients.

This soil is suitable for trees. The hazard of erosion during harvesting is the main management concern. Machine planting is practical in large areas.

The moderately slow permeability of the soil, slope, and a seasonal high water table limit the soil for most nonfarm uses, especially for onsite waste disposal.

The capability subclass is IIIe; woodland ordination symbol 3o.

AmB—Armagh silt loam, 0 to 8 percent slopes. This soil is nearly level and gently sloping, deep, and poorly drained. It is on flats and benches and in depressions. The areas are irregular in shape and range from 5 to 80 acres.

Typically, the surface layer is black silt loam 2 inches thick. The subsurface layer is mottled, dark gray, friable silt loam 4 inches thick. The subsoil extends to a depth of 44 inches. The upper 12 inches is mottled, light brownish gray, firm silty clay loam. The lower 26 inches is mottled, gray and light gray, firm silty clay. The substratum is mottled, gray, firm shaly silty clay to a depth of 60 inches or more.

Included with this soil in mapping are a few areas of Cavode and Wharton soils.

This Armagh soil has slow permeability and high available water capacity. Surface runoff is slow and medium. In unlimed areas reaction is strongly acid or very strongly acid throughout the soil. A high water table is between the surface and a depth of 6 inches.

Most areas of this soil are in pasture and woodland. Some areas are used for row crops.

If adequately drained, some areas of this soil are suitable for cultivated crops. Keeping natural drainageways open and using surface drains where outlets are available help to improve the drainage of the soil. Wetness causes the soil to warm slowly in the spring, and water ponded on the surface after heavy rainfall is a hazard for crops. The hazard of erosion on this soil is moderate.

The soil has fair potential for pasture. Prevention of grazing when the soil is wet and prevention of overgrazing are the major concerns of pasture management. If the pasture is grazed when the soil is wet, the surface layer of the soil becomes compacted. The use of proper stocking rates to maintain key plant species and the rotation of pastures are the chief management needs.

The soil is suitable for water-tolerant trees, but a high water table restricts the rooting depth and limits the use of equipment for much of the year. Uprooting of trees during windy periods is a hazard. Machine planting in large areas is practical during dry periods.

The slow permeability of the soil and a high water table limit the soil for most nonfarm uses, especially for onsite waste disposal. Some areas are suitable for wildlife habitat and recreational uses.

The capability subclass is IVw; woodland ordination symbol 3w.

At—Atkins silt loam. This soil is nearly level and poorly drained. It is on flood plains. The areas are irregular in shape and range from 2 to 30 acres.

Typically, the surface layer is dark gray silt loam about 4 inches thick. The subsurface layer is mottled, gray, friable silt loam about 8 inches thick. The subsoil extends to a depth of 42 inches. The upper 4 inches is mottled, light brownish gray, friable silt loam. The next 22 inches is mottled, gray, firm and friable silty clay loam. The lower 4 inches is mottled, dark grayish brown, firm silt loam. The substratum is mottled, dark grayish brown, firm silt loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Philo and Pope soils.

This Atkins soil has moderate to slow permeability and high available water capacity. Surface runoff is slow. In unlimed areas reaction is strongly acid or very strongly acid throughout the soil. A high water table is between the surface and a depth of 6 inches.

Most areas of this soil are in woodland and wooded pasture. A few areas are used for row crops.

If adequately drained, some areas of this soil are suitable for cultivated crops. Keeping natural drainageways open and using surface drains where outlets are available help to improve the drainage of the soil. Wetness causes the soil to warm slowly in spring, and water ponded on the surface after heavy rainfall is a hazard for crops.

The soil has fair potential for permanent pasture. Prevention of grazing when the soil is wet and prevention of overgrazing are major concerns of pasture management. If the pasture is grazed when the soil is wet, the surface layer of the soil becomes compacted. The use of proper stocking rates to maintain key plant species and the rotation of pastures are the chief management needs.

The soil is well suited to water-tolerant trees, but a high water table restricts the rooting depth and limits the use of equipment for much of the year. Uprooting during windy periods is a hazard. Machine planting on large areas is practical.

Flooding and a high water table limit this soil for most nonfarm uses, especially for onsite waste disposal. Some areas have potential for wildlife habitat and recreational uses.

The capability subclass is IIIw; woodland ordination symbol 1w.

BeB—Berks channery silt loam, 3 to 8 percent slopes. This soil is gently sloping, moderately deep, and well drained. It is on uplands. The areas are irregular in shape and range from 2 to 60 acres.

Typically, the surface layer is dark brown channery silt loam about 8 inches thick. The subsoil is yellowish brown and strong brown, friable channery silt loam and very channery silt loam 18 inches thick. The substratum is yellowish brown, friable very channery loam 4 inches thick. Very dark grayish brown shale bedrock is at a depth of 30 inches.

Included with this soil in mapping are a few areas of Gilpin and Weikert soils.

This Berks soil has moderate or moderately rapid permeability and very low available water capacity. Surface runoff is medium. In unlimed areas reaction is strongly acid and very strongly acid in the surface layer and upper part of the subsoil. It ranges from very strongly acid to medium acid in the substratum.

Most areas of this soil are used for crops and pasture. Some of the acreage is in woodland.

The areas of this soil used for cultivated crops have a moderate hazard of erosion. Growing cover crops, keeping crop residue on the surface, stripcropping, minimum tillage, using winter cover crops, and installing diversions and grassed waterways help to control erosion. Additions of crop residue and manure and fertilizer improve the fertility of the soil, reduce crusting, and increase water infiltration.

The use of proper stocking rates to maintain key plant species and the rotation of pastures are major pasture management concerns. Optimum production of pasture grasses requires maintenance of fertility through periodic applications of nutrients.

The soil is suitable for trees, but the rate of seedling mortality is a limitation. Machine planting is practical in large areas.

The moderate depth to bedrock, moderately rapid permeability, and a high percentage of rock fragments in the soil are the main limitations for most nonfarm uses, especially for onsite waste disposal.

The capability subclass is IIe; woodland ordination symbol 3f.

BeC—Berks channery silt loam, 8 to 15 percent slopes. This soil is sloping, moderately deep, and well drained. It is on uplands. The areas are irregular in shape and range from 2 to 40 acres.

Typically, the surface layer is dark brown channery silt loam about 8 inches thick. The subsoil is yellowish brown and strong brown, friable channery silt loam and very channery silt loam 18 inches thick. The substratum is yellowish brown, friable very channery loam 4 inches

thick. Very dark grayish brown shale bedrock is at a depth of 30 inches.

Included with this soil in mapping are a few areas of Gilpin and Weikert soils.

This Berks soil has moderate or moderately rapid permeability and very low available water capacity. Surface runoff is rapid. In unlimed areas reaction is strongly acid and very strongly acid in the surface layer and upper part of the subsoil. It is very strongly acid to medium acid in the substratum.

Most areas of this soil are in crops and pasture. Some of the acreage is in woodland.

The areas of this soil used for cultivated crops have a severe hazard of erosion. Growing cover crops, keeping crop residue on the surface, stripcropping, minimum tillage, using winter cover crops, and installing diversions and grassed waterways help to control erosion. Additions of crop residue and manure and fertilizer improve the fertility of the soil, reduce crusting, and increase water infiltration.

The use of proper stocking rates to maintain key plant species and the rotation of pastures are major pasture management concerns. Optimum production of pasture grasses requires maintenance of fertility through periodic applications of nutrients.

The soil is suitable for trees, but the rate of seedling mortality is a limitation. Machine planting is practical in large areas.

The depth to bedrock, moderately rapid permeability, slope, and high percentage of rock fragments in the soil are the main limitations for nonfarm uses, especially for onsite waste disposal.

The capability subclass is IIIe; woodland ordination symbol 3f.

BeD—Berks channery silt loam, 15 to 25 percent slopes. This soil is moderately steep, moderately deep, and well drained. It is on uplands. The areas are irregular in shape and range from 2 to 40 acres.

Typically, the surface layer is dark brown channery silt loam about 8 inches thick. The subsoil is yellowish brown and strong brown, friable channery silt loam and very channery silt loam 18 inches thick. The substratum is yellowish brown, friable very channery loam 4 inches thick. Very dark grayish brown shale bedrock is at a depth of 30 inches.

Included with this soil in mapping are a few areas of Gilpin and Weikert soils.

This soil has moderate to moderately rapid permeability and very low available water capacity. Surface runoff is very rapid. In unlimed areas reaction is strongly acid or very strongly acid in the surface layer and upper part of the subsoil. It is very strongly acid to medium acid in the substratum.

Areas of this soil used for cultivated crops have a severe hazard of erosion. Growing cover crops, keeping crop residue on the surface, stripcropping, minimum tillage, using winter cover crops, and installing diversions and grassed waterways help to control erosion. Additions of crop residue and fertilizer and manure improve the fertility of the soil, reduce crusting, and increase water infiltration.

Much of this soil is used for pasture. The use of proper stocking rates to maintain key plant species and the rotation of pastures are major pasture management concerns. Optimum production of pasture grasses requires maintenance of fertility through periodic applications of nutrients.

The soil is suitable for trees, and many areas are wooded. The rate of seedling mortality is a limitation for woodland, and slope interferes with the use of equipment. Machine planting is practical in large areas.

The depth to bedrock, moderately rapid permeability, slope, and a high percentage of rock fragments in the soil are the main limitations for most nonfarm uses, especially for onsite waste disposal.

The capability subclass is IVe; woodland ordination symbol 3f.

BmB—Blairton silt loam, 3 to 8 percent slopes. This soil is gently sloping, moderately deep, and somewhat poorly drained and moderately well drained. It is on side slopes of uplands adjacent to flats and depressions. The areas are irregular in shape and range from 2 to 60 acres.

Typically, the surface layer is very dark grayish brown silt loam about 9 inches thick. The subsoil is yellowish brown and strong brown shaly silty clay loam 21 inches thick. The upper part is friable, and the lower part is mottled and firm. The substratum is mottled, brown and light yellowish brown, firm shaly silt loam 8 inches thick. Very dark grayish brown shale bedrock is at a depth of 38 inches.

Included with this soil in mapping are a few areas of Berks, Gilpin, and Weikert soils.

This Blairton soil has moderately slow permeability and low to moderate available water capacity. Surface runoff is medium. In unlimed areas reaction ranges from strongly acid to extremely acid throughout the soil. A seasonal high water table is at a depth of 12 to 24 inches.

Most areas of this soil are in crops and pasture. Some of the acreage is used for woodland.

The areas of this soil used for cultivated crops have a moderate hazard of erosion. Growing cover crops, keeping crop residue on the surface, stripcropping, minimum tillage, using winter cover crops, and installing diversions and grassed waterways help to control erosion. Adding crop residue and manure and fertilizer to the soil improves the fertility, reduces crusting, and increases water infiltration.

The rotation of pastures and the use of proper stocking rates to maintain key plant species are major pasture management concerns. Grazing when the soil is

too wet causes surface compaction, excessive runoff, and poor tilth. Optimum production of pasture grass on this soil requires maintenance of fertility through periodic applications of nutrients.

The soil is suitable for trees. Machine planting is practical in large areas. The rooting depth of trees is restricted by the depth to bedrock.

The depth to bedrock, moderately slow permeability, and a seasonal high water table limit the soil for most nonfarm uses, especially for onsite waste disposal.

The capability subclass is IIIw; woodland ordination symbol 3w.

BmC—Blairton silt loam, 8 to 15 percent slopes. This soil is sloping, moderately deep, and somewhat poorly drained and moderately well drained. It is on side slopes adjacent to flats and depressions. The areas are irregular in shape and range from 2 to 15 acres.

Typically, the surface layer is very dark grayish brown silt loam about 9 inches thick. The subsoil is yellowish brown and strong brown shaly silty clay loam 21 inches thick. The upper part is friable, and the lower part is mottled and firm. The substratum is mottled, brown and light yellowish brown, firm shaly silt loam 8 inches thick. Very dark grayish brown shale bedrock is at a depth of 38 inches.

Included with this soil in mapping are a few areas of Berks, Gilpin, and Weikert soils.

This Blairton soil has moderately slow permeability and low to moderate available water capacity. Surface runoff is rapid. In unlimed areas reaction ranges from strongly acid to extremely acid throughout the soil. A seasonal high water table is at a depth of 12 to 24 inches.

Most areas of this soil are in crops and pasture. Some of the acreage is in woodland.

The areas of this soil used for cultivated crops have a severe hazard of erosion. Growing cover crops, keeping crop residue on the surface, stripcropping, minimum tillage, using winter cover crops, and installing diversions and grassed waterways help to control erosion. Adding crop residue and manure and fertilizer to the soil improves the fertility, reduces crusting, and increases water infiltration.

The use of proper stocking rates to maintain key plant species, deferred grazing, and rotation of pastures are major pasture management concerns. Grazing when the soil is too wet causes surface compaction, excessive runoff, and poor tilth. Optimum production of pasture grasses requires maintenance of fertility through periodic applications of nutrients.

The soil is suitable for trees. Machine planting is practical in large areas. The rooting depth to trees is restricted by the depth to bedrock.

Slope and the depth to bedrock, the seasonal high water table, and the moderately slow permeability limit this soil for most nonfarm uses, especially for onsite waste disposal.

The capability subclass is IVe; woodland ordination symbol 3w.

BnB—Blairton very stony silt loam, 3 to 8 percent slopes. This soil is gently sloping, moderately deep, and somewhat poorly drained and moderately well drained. It is on side slopes adjacent to flats and depressions. The areas are irregular in shape and range from 2 to 60 acres. Large stones cover about 3 to 15 percent of the surface area.

Typically, the surface layer is very dark grayish brown silt loam about 9 inches thick. The subsoil is yellowish brown and strong brown shaly silty clay loam 21 inches thick. The upper part is friable, and the lower part is mottled and firm. The substratum is mottled, brown and light yellowish brown, firm shaly silt loam 8 inches thick. Very dark grayish brown shale bedrock is at a depth of 38 inches.

Included with this soil in mapping are a few areas of Berks, Gilpin, and Weikert soils.

This Blairton soil has moderately slow permeability and low to moderate available water capacity. Surface runoff is medium. In unlimed areas reaction ranges from strongly acid to extremely acid throughout. A seasonal high water table is at a depth of 12 to 24 inches.

The stones on the surface make this soil generally unsuitable for farming. Most of the acreage of the soil is wooded, but the stones interfere with harvesting and planting equipment and the rooting depth of trees is restricted by the depth to bedrock.

The stones on the surface, the depth to bedrock, moderately slow permeability, and the seasonal high water table limit this soil for most nonfarm uses, especially for onsite sewage disposal.

The capability subclass is VIs; woodland ordination symbol 3w.

BpC—Blairton-Berks channery silt loams, 8 to 15 percent slopes. This complex consists of sloping, moderately deep soils on uplands. The areas are irregular in shape and range from 2 to 50 acres. The complex is about 60 percent somewhat poorly drained and moderately well drained Blairton soils, 30 percent well drained Berks soils, and 10 percent included soils. The Blairton and Berks soils are mapped together because they are so intermingled that it was not practical to map them separately.

Typically, the Blairton soils have a surface layer of very dark grayish brown channery silt loam about 9 inches thick. The subsoil is yellowish brown and strong brown shaly silty clay loam 21 inches thick. The upper part is friable, and the lower part is mottled and firm. The substratum is mottled, brown and light yellowish brown, firm shaly silt loam 8 inches thick. Very dark grayish brown shale bedrock is at a depth of 38 inches.

Typically, the Berks soils have a surface layer of dark brown channery silt loam about 8 inches thick. The

subsoil is yellowish brown and strong brown, friable channery silt loam and very channery silt loam 18 inches thick. The substratum is yellowish brown, friable very channery loam 4 inches thick. Very dark grayish brown shale bedrock is at a depth of 30 inches.

Included with these soils in mapping are small areas of Weikert and Gilpin soils.

Permeability is moderately slow in the Blairton soils and moderate and moderately rapid in the Berks soils. Reaction in the Blairton soils ranges from strongly acid to extremely acid throughout; in the Berks soils it is strongly acid to very strongly acid in the surface layer and upper part of the subsoil and very strongly acid to medium acid in the substratum. A seasonal high water table is at a depth of 12 to 24 inches.

Most areas of these soils are used for cultivated crops and pasture. The areas used for crops have a severe hazard of erosion. Minimum tillage, installing diversions and grassed waterways, and using cover crops help to control erosion. Adding crop residue and manure and fertilizer to the soil maintains the fertility and organic matter content.

The use of proper stocking rates to maintain key plant species, deferred grazing, and rotation of pastures are major pasture management concerns. Grazing on the Blairton soils when they are wet causes surface compaction. Optimum production of pasture grasses requires periodic applications of nutrients.

The soils are suitable for trees, but the rate of seedling mortality is a hazard on the Berks soils and erosion is a hazard on the Blairton soils. Rooting depth in the Blairton soils is restricted by the depth to bedrock. Machine planting is practical in large areas.

The moderate depth to bedrock, a seasonal high water table, moderately slow permeability, and slope limit these soils for most nonfarm uses, especially for onsite sewage disposal.

The capability subclass is IVe; woodland ordination symbol for the Blairton part is 3w, for the Berks part 3c.

BtB—Brinkerton silt loam, 0 to 8 percent slopes. This soil is deep, nearly level and gently sloping, and poorly drained. It is on foot slopes and in depressions. The areas are irregular in shape and range from 2 to 120 acres.

Typically, the surface layer is grayish brown silt loam about 3 inches thick. The subsoil extends to a depth of 60 inches or more. The upper 4 inches is grayish brown, friable silt loam. The next 10 inches is mottled, light brownish gray, friable silty clay loam. The lower 11 inches is mottled, gray, firm silty clay loam. A layer of mottled, gray and brown, firm and brittle silty clay loam and gravelly silt loam is at a depth of 28 inches.

Included with this soil in mapping are a few areas of Berks, Gilpin, and Ernest soils.

This Brinkerton soil has slow permeability and moderate available water capacity. Surface runoff is slow to medium. In unlimed areas reaction ranges from medium acid to very strongly acid in the surface layer and upper part of the subsoil. It is strongly acid to slightly acid in the lower part of the subsoil. The depth to the firm and brittle part of the soil is 15 to 30 inches. A high water table is between the surface and a depth of 6 inches.

Most areas of this soil are used for woodland and permanent pasture. Some drained areas are used for row crops.

The areas of this soil used for cultivated crops have a moderate hazard of erosion. Wetness causes the soil to warm slowly in the spring, and water ponded on the surface after heavy rainfall is a hazard for crops. Keeping natural drainageways open and using surface drains where outlets are available help to improve the drainage of the soil.

Prevention of grazing on this soil when it is wet and prevention of overgrazing are major concerns of pasture management. Grazing when the soil is wet compacts the surface layer. The use of proper stocking rates to maintain key plant species and the rotation of pastures are chief management needs.

This soil is suitable for moisture-tolerant trees and grasses, but the rooting depth of trees is restricted by the firm and brittle layer in the soil and by the high water table.

The high water table and slow permeability limit the soil for most nonfarm uses, especially for onsite sewage disposal. Some areas, however, are suitable for wildlife habitat and recreation.

The capability subclass is IVw; woodland ordination symbol 2w.

BvB—Brinkerton very stony silt loam, 0 to 8 percent slopes. This soil is deep, gently sloping, and poorly drained. It is on foot slopes and depressions. The areas are irregular in shape and range from 2 to 120 acres. Large stones cover 3 to 15 percent of the surface area.

Typically, the surface layer is grayish brown silt loam about 3 inches thick. The subsoil extends to a depth of 60 inches or more. The upper 4 inches is grayish brown, friable silt loam. The next 10 inches is mottled, light brownish gray, friable silty clay loam. The lower 11 inches is mottled, gray, firm silty clay loam. A layer of mottled, gray, firm and brittle silty clay loam and gravelly silt loam is at a depth of 28 inches.

Included with this soil in mapping are a few areas of Berks, Gilpin, and Ernest soils.

This Brinkerton soil has slow permeability and moderate available water capacity. Surface runoff is slow. In unlimed areas reaction ranges from medium acid to very strongly acid in the surface layer and upper part of the subsoil. It is strongly acid to slightly acid in the lower part of the subsoil. The depth to the firm and brittle part of the soil ranges from 15 to 30 inches. The

high water table is between the surface and a depth of 6 inches.

The stones on the surface make this soil generally unsuitable for farming. The soil is suitable for trees, and much of the acreage is wooded, but the rooting depth is restricted by the firm and brittle layer in the soil and by the seasonal high water table. The stones on the surface also interfere with the use of equipment.

The stony surface is a limitation for nonfarm uses of the soil, and the slow permeability and high water table limit many nonfarm uses, especially onsite sewage disposal.

The capability subclass is VIIs; woodland ordination symbol 2w.

CaA—Cavode silt loam, 0 to 3 percent slopes. This soil is deep, nearly level, and somewhat poorly drained. It is on upland ridgetops and benches. The areas are irregular in shape and range from 2 to 120 acres.

Typically, the surface layer is dark grayish brown silt loam about 6 inches thick. The subsoil is about 52 inches thick. The upper 8 inches is yellowish brown, friable silty clay loam. The next 28 inches is grayish brown and light brownish gray, firm silty clay. The lower 16 inches is grayish brown, firm shaly silty clay. The substratum is dark yellowish brown, firm shaly silty clay to a depth of 60 inches or more.

Included with this soil in mapping are a few areas of Wharton and Armagh soils.

This Cavode soil has slow permeability and high available water capacity. Surface runoff is slow. In unlimed areas reaction is strongly acid and very strongly acid throughout the soil. A seasonal high water table is at a depth of 6 to 18 inches.

Most areas of this soil are used for woodland. Some areas are used for permanent pasture and some for crops.

Areas of this soil used for cultivated crops have a slight hazard of erosion. Keeping crop residue on the surface and including hay in the cropping system are ways of maintaining the organic matter content and tilth of the soil. The seasonal high water table delays tillage in the spring; the use of surface and subsurface drains helps to improve drainage.

The use of proper stocking rates to maintain key plant species, rotation of pastures, and restricted grazing when the soil is wet are major concerns of pasture management. If the pasture is grazed when the soil is wet, the surface layer of the soil becomes compacted. Optimum production of pasture grasses requires surface and subsurface drainage and maintenance of fertility through periodic applications of nutrients.

This soil is suitable for trees, but the seasonal high water table delays harvesting during wet periods. Machine planting is practical in large areas.

The seasonal high water table and the slow permeability of the soil are the main limitations for most types of nonfarm uses, especially for onsite sewage disposal.

The capability subclass is IIIw; woodland ordination symbol 2w.

CaB—Cavode silt loam, 3 to 8 percent slopes. This soil is deep, gently sloping, and somewhat poorly drained. It is on upland ridgetops and benches. The areas are irregular in shape and range from 2 to 150 acres.

Typically, the surface layer is dark grayish brown silt loam about 6 inches thick. The subsoil is about 52 inches thick. The upper 8 inches is yellowish brown, friable silty clay loam. The next 28 inches is grayish brown and light brownish gray, firm silty clay. The lower 16 inches is grayish brown, firm shaly silty clay. The substratum is dark yellowish brown, firm shaly silty clay to a depth of 60 inches or more.

Included with this soil in mapping are a few areas of Gilpin, Wharton, and Armagh soils.

This Cavode soil has slow permeability and high available water capacity. Surface runoff is medium. In unlimed areas reaction is strongly acid and very strongly acid throughout the soil. A seasonal high water table is at a depth of 6 to 18 inches.

Much of the acreage of this soil is used for woodland. Some areas are used for permanent pasture and some for crops.

The areas of this soil used for cultivated crops have a moderate hazard of erosion. Stripcropping and using diversions, grassed waterways, and cover crops help to control erosion. Keeping crop residue on the surface and including hay in the cropping system maintain the organic matter content and tilth of the soil. The use of surface and subsurface drains helps to improve drainage.

The use of proper stocking rates to maintain key plant species, rotation of pastures, and restricted grazing when the soil is wet are major concerns of pasture management. If the pasture is grazed when the soil is wet, the surface layer of the soil becomes compacted. Optimum production of pasture grasses requires maintenance of fertility through periodic applications of nutrients.

This soil is suitable for trees, but the seasonal high water table delays harvesting during wet periods. Machine planting is practical in large areas.

The seasonal high water table and slow permeability limit the soil for most nonfarm uses, especially for onsite sewage disposal.

The capability subclass is IIIw; woodland ordination symbol 2w.

CaC—Cavode silt loam, 8 to 15 percent slopes. This soil is deep, sloping, and somewhat poorly drained. It is on upland ridgetops and benches. The areas are irregular in shape and range from 2 to 40 acres.

Typically, the surface layer is dark grayish brown silt loam about 6 inches thick. The subsoil is about 52 inches thick. The upper 8 inches is yellowish brown, friable silty clay loam. The next 28 inches is grayish brown and light brownish gray, firm silty clay. The lower 16 inches is grayish brown, firm shaly silty clay. The substratum is dark yellowish brown, firm shaly silty clay to a depth of 60 inches or more.

Included with this soil in mapping are a few areas of Gilpin, Wharton, and Armagh soils.

This Cavode soil has slow permeability and high available water capacity. Surface runoff is rapid. In unlimed areas reaction ranges from strongly acid to very strongly acid throughout the soil. A seasonal high water table is at a depth of 6 to 18 inches.

Most areas of this soil are used for woodland. Some areas are used for permanent pasture and some for crops.

The areas of this soil used for cultivated crops have a severe hazard of erosion. Stripcropping and using diversions, grassed waterways, and cover crops help to reduce erosion. Keeping crop residue on the surface and including hay in the cropping system maintain the organic matter content and tilth of the soil. The use of subsurface and surface drains helps to improve drainage.

The use of proper stocking rates to maintain key plant species, rotation of pastures, and restricted grazing when the soil is wet are major concerns of pasture management. If the pasture is grazed when the soil is wet, the surface layer of the soil becomes compacted. Optimum production of pasture grasses requires maintenance of fertility through periodic applications of nutrients.

This soil is suitable for trees, but the seasonal high water table delays harvesting during wet seasons. Machine planting is practical in large areas.

The seasonal high water table, slow permeability, and slope limit the soil for most nonfarm uses, especially for onsite sewage disposal.

The capability subclass is IIIe; woodland ordination symbol 2w.

CbB—Cavode very stony silt loam, 0 to 8 percent slopes. This soil is deep, gently sloping, and somewhat poorly drained. It is on upland ridgetops and benches. The areas are irregular in shape and range from 5 to 10 acres. Large stones cover 3 to 15 percent of the surface area.

Typically, the surface layer is dark grayish brown silt loam about 6 inches thick. The subsoil is about 52 inches thick. The upper 8 inches is yellowish brown, friable silty clay loam. The next 28 inches is grayish brown and light brownish gray, firm silty clay. The lower 16 inches is grayish brown, firm shaly silty clay. The substratum is dark yellowish brown, firm shaly silty clay to a depth of 60 inches or more.

Included with this soil in mapping are a few areas of Gilpin and Wharton soils.

This Cavode soil has slow permeability and high available water capacity. Surface runoff is slow to medium. In unlimed areas reaction is strongly acid and very strongly acid throughout the soil. The seasonal high water table is at a depth of 6 to 18 inches.

The stones on the surface make this soil generally unsuitable for cultivated crops. The soil is suitable for trees, and much of the acreage is wooded, but the seasonal high water table limits the rooting depth and interferes with harvesting during wet seasons. The stones on the surface also limit the use of woodland harvesting and planting equipment.

The slow permeability, seasonal high water table, and stony surface limit this soil for many nonfarm uses, especially for onsite sewage disposal.

The capability subclass is VIs; woodland ordination symbol 2w.

CeA—Cookport and Ernest soils, 0 to 3 percent slopes. This unit consists of nearly level areas of moderately well drained, deep Cookport and Ernest soils on uplands. The areas range from 2 to 80 acres and are irregularly shaped. The mapped acreage of this unit is about 65 percent Cookport soils, 25 percent Ernest soils, and 10 percent other soils. The Cookport and Ernest soils were mapped together because they have no major differences in use and management. Some areas of the unit consist entirely of Cookport soils, some of Ernest soils, and some of both.

Typically, the Cookport soils have a surface layer of friable, very dark brown and dark brown channery loam 4 inches thick. The subsoil is 36 inches thick. The upper 19 inches is yellowish brown, friable loam and channery loam. The next 3 inches is mottled, light olive brown, friable channery loam. The lower 14 inches is mottled, light olive brown, firm and brittle channery loam. The substratum is mottled, grayish brown, firm channery sandy loam to a depth of 60 inches or more.

Typically, the Ernest soils have a surface layer of friable, dark yellowish brown silt loam 8 inches thick. The subsoil is 33 inches thick. The upper 8 inches is yellowish brown, friable silt loam and yellowish brown, friable to firm silty clay loam. The next 10 inches is mottled, yellowish brown, friable to firm silty clay loam. The lower 15 inches is mottled, brown and olive brown, very firm and brittle silty clay loam. The substratum is mottled, yellowish brown, very firm silty clay loam to a depth of 60 inches or more.

Included with these soils in mapping are small areas of Hazleton, Gilpin, Brinkerton, and Nolo soils.

These Cookport and Ernest soils have moderately slow and slow permeability and moderate available water capacity. Surface runoff is slow. In unlimed areas reaction is strongly acid and very strongly acid

throughout the soils. A seasonal high water table is at a depth of 18 to 30 inches.

Most areas of these soils are in crops and pasture. Some of the acreage is in woodland, and a few small areas are used for building sites and recreation.

The areas of these soils used for cultivated crops have a slight hazard of erosion. Growing cover crops, keeping crop residue on the surface, and including hay in the cropping system maintain the organic matter content and tilth of the soil. The use of surface and subsurface drains helps to improve drainage.

The use of proper stocking rates to maintain key plant species, rotation of pastures, and restricted grazing when the soils are wet are the main pasture management concerns. Grazing when the soils are wet causes surface compaction, excessive runoff, and poor tilth.

These soils are suitable for trees, but the seasonal high water table delays harvesting during wet periods. The rooting depth is restricted by the firm and brittle layer in the subsoil. Machine planting is practical in large areas.

The seasonal high water table and slow and moderately slow permeability limit these soils for most nonfarm uses, especially for onsite sewage disposal. Some areas are suitable for recreation and wildlife habitat.

The capability subclass is IIw; woodland ordination symbol 2w.

CeB—Cookport and Ernest soils, 3 to 8 percent slopes. This unit consists of gently sloping areas of moderately well drained, deep Cookport and Ernest soils on uplands. The areas range from 2 to 650 acres and are irregularly shaped. The mapped acreage of this unit is about 65 percent Cookport soils, 25 percent Ernest soils, and 10 percent other soils. The Cookport and Ernest soils were mapped together because they have no major differences in use and management. Some areas of the unit consist entirely of Cookport soils, some of Ernest soils, and some of both.

Typically, the Cookport soils have a surface layer of friable, very dark brown and dark brown channery loam 4 inches thick. The subsoil is 36 inches thick. The upper 19 inches is yellowish brown, friable loam and channery loam. The next 3 inches is mottled, light olive brown, friable channery loam. The lower 14 inches is mottled, light olive brown, firm and brittle channery loam. The substratum is mottled, grayish brown, firm channery sandy loam to a depth of 60 inches or more.

Typically, the Ernest soils have a surface layer of friable, dark yellowish brown silt loam 8 inches thick. The subsoil is 33 inches thick. The upper 8 inches is yellowish brown, friable silt loam and yellowish brown, friable to firm silty clay loam. The next 10 inches is mottled, yellowish brown, friable to firm silty clay loam. The lower 15 inches is mottled, brown and olive brown, very firm and brittle silty clay loam. The substratum is mottled, yellowish brown, very firm silty clay loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Hazleton, Gilpin, Brinkerton, and Nolo soils.

The permeability of these Cookport and Ernest soils is moderately slow and slow. Surface runoff is medium. Available water capacity is moderate. Reaction is strongly acid and very strongly acid throughout the soils. A seasonal high water table is at a depth of 18 to 30 inches.

Most areas of these soils are in crops and pasture. Some of the acreage is in woodland, and a few small areas are used for building sites and recreation.

The areas of these soils used for cultivated crops have a moderate hazard of erosion. Stripcropping and using diversions, grassed waterways, and cover crops help to control erosion and reduce runoff. The use of surface and subsurface drains helps to improve drainage.

The use of proper stocking rates to maintain key plant species, rotation of pastures, and restricted grazing during wet periods are the main pasture management concerns. Grazing on these soils when they are wet causes surface compaction.

These soils are suitable for tree production, but the seasonal high water table delays harvesting during wet periods. The rooting depth is restricted by the firm and brittle layer in the subsoil. Machine planting is practical in large areas.

The slow and moderately slow permeability and the seasonal high water table limit these soils for most nonfarm uses, especially for onsite sewage disposal. Some areas are suitable for recreation and wildlife habitat.

The capability subclass is IIe; woodland ordination symbol 2w.

CeC—Cookport and Ernest soils, 8 to 15 percent slopes. This unit consists of sloping areas of moderately well drained, deep Cookport and Ernest soils on uplands. The areas range from 2 to 100 acres and are irregularly shaped. The mapped acreage of this unit is about 65 percent Cookport soils, 25 percent Ernest soils, and 10 percent other soils. The Cookport and Ernest soils were mapped together because they have no major differences in use and management. Some areas of the unit consist entirely of Cookport soils, some of Ernest soils, and some of both.

Typically, the Cookport soils have a surface layer of friable, very dark brown and dark brown channery loam 4 inches thick. The subsoil is 36 inches thick. The upper 19 inches is yellowish brown, friable loam and channery loam. The next 3 inches is mottled, light olive brown, friable channery loam. The lower 14 inches is mottled, light olive brown, firm and brittle channery loam. The

substratum is mottled, grayish brown, firm channery sandy loam to a depth of 60 inches or more.

Typically, the Ernest soils have a surface layer of friable, dark yellowish brown silt loam 8 inches thick. The subsoil is 33 inches thick. The upper 8 inches is yellowish brown, friable silt loam and yellowish brown, friable to firm silty clay loam. The next 10 inches is mottled, yellowish brown, friable to firm silty clay loam. The lower 15 inches is mottled, brown and olive brown, very firm and brittle silty clay loam. The substratum is mottled, yellowish brown, very firm silty clay loam to a depth of 60 inches or more.

Included with these soils in mapping are small areas of Hazleton, Gilpin, Brinkerton, and Nolo soils.

The permeability of these Cookport and Ernest soils is moderately slow to slow. Surface runoff is rapid, and available water capacity is moderate. A seasonal high water table is at a depth of 18 to 30 inches. Reaction is strongly acid and very strongly acid throughout the soils.

Most areas of these soils are used for cultivated crops and pasture. The areas used for crops have a severe hazard of erosion. Stripcropping and using diversions, grassed waterways, and cover crops help to control erosion and reduce runoff. The use of surface and subsurface drains improves drainage.

The use of proper stocking rates to maintain key plant species, the prevention of overgrazing, and pasture rotations are major pasture management concerns. Grazing when these soils are too wet causes surface compaction. Periodic applications of nutrients will help maintain maximum production of pasture grasses.

These soils are suitable for tree production, but the seasonal high water table delays harvesting during wet periods. The rooting depth is restricted by the firm and brittle layer in the subsoil. Machine planting is practical in large areas.

Slope, the slow and moderately slow permeability, and the seasonal high water table limit these soils for many nonfarm uses, especially for onsite sewage disposal. Some areas are suitable for recreation and wildlife habitat.

The capability subclass is IIIe; woodland ordination symbol 2w.

CeD—Cookport and Ernest soils, 15 to 25 percent slopes. This unit consists of moderately steep areas of moderately well drained, deep Cookport and Ernest soils on uplands. The areas range from 2 to 60 acres and are irregularly shaped. The mapped acreage of this unit is about 65 percent Cookport soils, 25 percent Ernest soils, and 10 percent other soils. The Cookport and Ernest soils were mapped together because they have no major differences in use and management. Some areas of the unit consist entirely of Cookport soils, some of Ernest soils, and some of both.

Typically, the Cookport soils have a surface layer of friable, very dark brown and dark brown channery loam 4 inches thick. The subsoil is 36 inches thick. The upper 19 inches is yellowish brown, friable loam and channery loam. The next 3 inches is mottled, light olive brown, firm and brittle channery loam. The lower 14 inches is mottled, light olive brown, firm and brittle channery loam. The substratum is mottled, grayish brown, firm channery sandy loam to a depth of 60 inches or more.

Typically, the Ernest soils have a surface layer of friable, dark yellowish brown silt loam 8 inches thick. The subsoil is 33 inches thick. The upper 8 inches is yellowish brown, friable silt loam and yellowish brown, friable to firm silty clay loam. The next 10 inches is mottled, yellowish brown, friable to firm silty clay loam. The lower 15 inches is mottled, brown and olive brown, very firm and brittle silty clay loam. The substratum is mottled, yellowish brown, very firm silty clay loam to a depth of 60 inches or more.

Included with these soils in mapping are small areas of Hazleton, Gilpin, Brinkerton, and Nolo soils.

The permeability of these Cookport and Ernest soils is moderately slow to slow. Surface runoff is rapid, and available water capacity is moderate. A seasonal high water table is at a depth of 18 to 30 inches. Reaction is strongly acid and very strongly acid throughout the soils.

The areas of these soils used for cultivated crops have a severe hazard of erosion. Minimum tillage, diversions, grassed waterways, stripcropping, and cover crops help to control erosion and reduce runoff. Adding crop residue and manure and fertilizer to the soil maintains the fertility and organic matter content.

The use of proper stocking rates to maintain key plant species and pasture rotation are major pasture management concerns. Grazing when these soils are too wet causes surface compaction, excessive runoff, and poor tilth. Periodic applications of nutrients will help maintain optimum production of pasture grasses.

These soils are suitable for trees, and most areas are wooded. Slope and the seasonal high water table are major limitations for woodland management. The rooting depth is restricted by the firm and brittle layer in the subsoil. Machine planting is practical in large areas.

Slope, the slow and moderately slow permeability, and the seasonal high water table limit these soils for many nonfarm uses. Some areas are suitable for recreation and wildlife habitat.

The capability subclass is IVe; woodland ordination symbol 2w.

CvB—Cookport and Ernest very stony soils, 0 to 8 percent slopes. This unit consists of nearly level and gently sloping, moderately well drained, deep Cookport and Ernest soils on uplands. The areas range from 2 to 60 acres and are irregularly shaped. The mapped acreage of this unit is about 60 percent Cookport soils, 25 percent Ernest soils, and 15 percent other soils. The Cookport and Ernest soils were mapped together because they have no major differences in use and

management. Some areas of the unit consist entirely of Cookport soils, some of Ernest soils, and some of both. Stones that are 10 to 36 inches in diameter cover 3 to 15 percent of the surface of the unit.

Typically, the Cookport soils have a surface layer of friable, very dark brown and dark brown channery loam 4 inches thick. The subsoil is 36 inches thick. The upper 19 inches is yellowish brown, friable loam and channery loam. The next 3 inches is mottled, light olive brown, friable channery loam. The lower 14 inches is mottled, light olive brown, firm and brittle channery loam. The substratum is mottled, grayish brown, firm channery sandy loam to a depth of 60 inches or more.

Typically, the Ernest soils have a surface layer of friable, dark yellowish brown silt loam 8 inches thick. The subsoil is 33 inches thick. The upper 8 inches is yellowish brown, friable silt loam and yellowish brown, friable to firm silty clay loam. The next 10 inches is mottled, yellowish brown, friable to firm silty clay loam. The lower 15 inches is mottled, brown and olive brown, very firm and brittle silty clay loam. The substratum is mottled, yellowish brown very firm silty clay loam to a depth of 60 inches or more.

Included with this unit in mapping are a few areas of Hazleton, Leetonia, and Nolo soils.

These Cookport and Ernest soils have moderately slow and slow permeability and moderate available water capacity. Surface runoff is slow. In unlimed areas reaction is strongly acid and very strongly acid throughout the soils. The seasonal high water table is at a depth of 18 to 30 inches.

The stones on the surface make these soils generally unsuitable for farming. The soils are suitable for trees, and most of the acreage is wooded, but the rooting depth is restricted by a firm and brittle layer in the subsoil and by the seasonal high water table. The high water table delays harvesting during wet periods, and the stones on the surface interfere with woodland harvesting and planting.

The stony surface, the slow or moderately slow permeability, and the seasonal high water table limit these soils for most nonfarm uses, especially for onsite sewage disposal.

The capability subclass is VIs; woodland ordination symbol 2w.

CvD—Cookport and Ernest very stony soils, 8 to 25 percent slopes. This unit consists of sloping and moderately steep, moderately well drained, deep Cookport and Ernest soils on uplands. The areas range from 2 to 60 acres and are irregularly shaped. The mapped acreage of this unit is about 60 percent Cookport soils, 25 percent Ernest soils, and 15 percent other soils. The Cookport and Ernest soils were mapped together because they have no major differences in use and management. Some areas of the unit consist entirely of Cookport soils, some of Ernest soils, and some of both. Stones that are 10 to 36 inches in diameter cover 3 to 15 percent of the surface of the unit.

Typically, the Cookport soils have a surface layer of friable, very dark brown and dark brown channery loam 4 inches thick. The subsoil is 36 inches thick. The upper 19 inches is yellowish brown, friable loam and channery loam. The next 3 inches is mottled, light olive brown, friable channery loam. The lower 14 inches is mottled, light olive brown, firm and brittle channery loam. The substratum is mottled, grayish brown firm channery sandy loam to a depth of 60 inches or more.

Typically, the Ernest soils have a surface layer of friable, dark yellowish brown silt loam 8 inches thick. The subsoil is 33 inches thick. The upper 8 inches is yellowish brown, friable silt loam and yellowish brown, friable to firm silty clay loam. The next 10 inches is mottled, yellowish brown friable to firm silty clay loam. The lower 15 inches is mottled, brown and olive brown, very firm and brittle silty clay loam. The substratum is mottled, yellowish brown, very firm silty clay loam to a depth of 60 inches or more.

Included with these soils in mapping are a few areas of Hazleton, Leetonia, and Nolo soils.

These Cookport and Ernest soils have moderately slow and slow permeability and moderate available water capacity. Surface runoff is medium to rapid. In unlimed areas reaction is strongly acid and very strongly acid throughout the soils. The seasonal high water table is at a depth of 18 to 30 inches.

The stones on the surface make these soils generally unsuitable for farming. The soils are suitable for woodland, and most of the areas are wooded, but the rooting depth is restricted by the seasonal high water table and the firm and brittle layer in the subsoil. The water table also delays harvesting during wet seasons, and the stones on the surface limit the use of woodland harvesting and planting equipment.

Slope, the seasonal high water table, the stones on the surface, and the slow and moderately slow permeability limit these soils for most nonfarm uses, especially for onsite sewage disposal.

The capability subclass is VIs; woodland ordination symbol 2w.

Dp—Dumps, industrial wastes. This unit consists of areas of industrial wastes, mainly mounds and piles of slag from steel manufacturing.

Included with this unit in mapping are a few small areas of Gilpin, Wharton, Hazleton, Rayne, and Weikert soils.

This unit is poorly suited to most uses. Onsite investigation is required to determine the potential of the areas for any use. Accessible areas of the unit are a source of fill used in construction of roads and dams and in the manufacture of cement blocks.

This unit is not assigned to a capability subclass or woodland ordination symbol.

Figure 5.—An area of Dumps, mine.

Du—Dumps, mine. This unit consists of refuse from underground coal-mining operations (fig. 5). The refuse material is mostly poor-quality coal and rock stockpiled during the mining operations. The areas mainly range from 10 to 200 acres. The material is 5 feet to more than 50 feet deep.

Included with this unit in mapping are small strip-mine areas and small areas of Gilpin, Wharton, Hazleton, and Rayne soils.

The material in this unit has rapid permeability and very low available water capacity. Runoff is very rapid. Unlimed areas are very strongly acid and extremely acid throughout. The hazard of erosion is very severe.

This unit is poorly suited to most uses. Onsite investigation is required to determine the potential for any use.

The unit is not assigned to a capability subclass or woodland ordination symbol.

GnB—Gilpin silt loam, 3 to 8 percent slopes. This soil is gently sloping, moderately deep, and well drained. It is on uplands. The areas are irregular in shape and range from 2 to 150 acres.

Typically, the surface layer is very dark grayish brown silt loam about 10 inches thick. The subsoil is yellowish brown, friable channery silty clay loam 18 inches thick. The substratum is light olive brown, friable very channery silt loam 10 inches thick. Light olive brown shale and siltstone bedrock is at a depth of 38 inches.

Included with this soil in mapping are a few areas of Rayne, Wharton, and Ernest soils.

This Gilpin soil has moderate permeability and moderate available water capacity. Surface runoff is medium. In unlimed areas reaction ranges from strongly acid to extremely acid throughout the soil.

Most areas of this soil are in cropland. Some of the acreage is wooded.

The areas of this soil used for cultivated crops have a moderate hazard of erosion. Growing cover crops, keeping crop residue on the surface, stripcropping, minimum tillage, and using winter cover crops, diversions, and grassed waterways help prevent erosion. Returning crop residue to the soil or adding other organic material and the use of fertilizer help to improve fertility, reduce crusting, and increase water infiltration.

The use of proper stocking rates to maintain key plant species and rotation of pastures are major pasture management concerns. Optimum production of pasture grasses requires maintenance of fertility through periodic applications of nutrients.

The soil is suitable for trees. Machine planting is practical in large areas. The rooting depth is restricted by the depth to bedrock.

The depth to bedrock limits this soil for many nonfarm uses, especially for onsite sewage disposal.

The capability subclass is IIe; woodland ordination symbol 2o.

GpB—Gilpin very stony silt loam, 3 to 8 percent slopes. This soil is gently sloping, moderately deep, and well drained. It is on uplands. The areas are irregular in shape and range from 2 to 240 acres. Stones that are 10 to 36 inches in diameter cover 3 to 15 percent of the surface.

Typically, the surface layer is very dark grayish brown silt loam about 10 inches thick. The subsoil is yellowish brown, friable channery silty clay loam 18 inches thick. The substratum is light olive brown, friable very channery silt loam 10 inches thick. Light olive brown shale and siltstone bedrock is at a depth of 38 inches.

Included with this soil in mapping are a few small areas of Rayne, Wharton, and Ernest soils.

This Gilpin soil has moderate permeability and moderate available water capacity. Surface runoff is medium. In unlimed areas reaction ranges from strongly acid to extremely acid throughout the soil.

The stones on the surface make this soil generally unsuitable for farming. The soil is suitable for trees, and most of the acreage is wooded, but stones on the surface and the depth to bedrock are limitations for woodland management.

The stones on the surface and depth to bedock also limit the soil for many nonfarm uses, especially for onsite sewage disposal. Some areas are suitable for wildlife habitat and recreation.

The capability subclass is VIs; woodland ordination symbol 2o.

GpD—Gilpin very stony silt loam, 8 to 25 percent slopes. This soil is moderately deep, sloping to moderately steep, and well drained. It is on uplands. The areas are irregular in shape and range from 2 to 70 acres. Stones that are 10 to 36 inches in diameter cover 3 to 15 percent of the surface.

Typically, the surface layer is very dark grayish brown silt loam about 10 inches thick. The subsoil is yellowish brown, friable channery silty clay loam 18 inches thick. The substratum is light olive brown, friable very channery silt loam 10 inches thick. Light olive brown shale and siltstone bedrock is at a depth of 38 inches.

Included with this soil in mapping are a few areas of Rayne, Wharton, and Ernest soils.

This Gilpin soil has moderate permeability and moderate available water capacity. Surface runoff is rapid. In unlimed areas reaction ranges from strongly acid to extremely acid throughout the soil.

The stones on the surface make this soil generally unsuitable for farming. The soil is suitable for trees, and much of the acreage is wooded, but the rooting depth is limited by the depth to bedrock. Slope interferes with the use of woodland harvesting equipment and makes the use of erosion-control practices necessary in places during harvesting.

Slope, the stony surface, and the depth to bedrock also limit this soil for many nonfarm uses, especially for onsite waste disposal.

The capability subclass is VIs; woodland ordination symbol 2r.

GtC—Gilpin-Rayne silt loams, 8 to 15 percent slopes. This complex consists of sloping, well drained soils on rolling uplands. The areas are irregular in shape and range from 2 to 80 acres. The complex consists of about 60 percent moderately deep Gilpin soils, 30 percent deep Rayne soils, and 10 percent other soils. The Gilpin and Rayne soils are so intermingled that it was not practical to map them separately.

Typically, the Gilpin soils have a surface layer of very dark grayish brown silt loam about 10 inches thick. The subsoil is yellowish brown, friable channery silty clay loam 18 inches thick. The substratum is light olive brown, friable very channery silt loam 10 inches thick. Light olive brown shale and siltstone bedrock is at a depth of 38 inches.

Typically, the Rayne soils have a surface layer of dark brown silt loam about 8 inches thick. The subsoil is yellowish brown, friable and firm silty clay loam and shaly silty clay loam 32 inches thick. The substratum is yellowish brown very shaly silty clay loam to a depth of 60 inches or more.

Included with these soils in mapping are small areas of Wharton and Berks soils.

The permeability of these Gilpin and Rayne soils is moderate. In unlimed areas reaction is strongly acid to extremely acid in the Gilpin soils and strongly acid to very strongly acid in the Rayne soils.

Most areas of these soils are in cropland and pasture. Some of the acreage is wooded.

The areas of these soils used for cultivated crops have a severe hazard of erosion. Growing cover crops, keeping crop residue on the surface, stripcropping, minimum tillage, and using winter cover crops, diversions, and grassed waterways help to control erosion. Adding crop residue and fertilizer or the addition of other organic material improves the fertility of the soil, reduces crusting, and increases water infiltration.

The use of proper stocking rates to maintain key plant species and the rotation of pastures are major pasture management concerns on these soils. Optimum production of pasture grasses requires maintenance of fertility through periodic applications of nutrients.

These soils are suitable for trees. Machine planting is practical in large areas. The rooting depth in the Gilpin soils is restricted by the depth to bedrock.

Slope and the depth to bedrock in the Gilpin soils limit this complex for some nonfarm uses, especially for onsite sewage disposal.

The capability subclass is IIIe; woodland ordination symbol 2o.

GtD—Gilpin-Rayne silt loams, 15 to 25 percent slopes. This complex consists of moderately steep, well drained soils on uplands. The areas are irregular in shape and range from 3 to 80 acres. The complex consists of about 60 percent moderately deep Gilpin soils, 30 percent deep Rayne soils, and 10 percent other soils. The Gilpin and Rayne soils are so intermingled that it was not practical to map them separately.

Typically, the Gilpin soils have a surface layer of very dark grayish brown silt loam about 10 inches thick. The subsoil is yellowish brown, friable channery silty clay loam 18 inches thick. The substratum is light olive brown, friable very channery silt loam 10 inches thick. Light olive brown shale and siltstone bedrock is at a depth of 38 inches.

Typically, the Rayne soils have a surface layer of dark brown silt loam about 8 inches thick. The subsoil is yellowish brown, friable and firm silty clay loam and shaly silty clay loam 32 inches thick. The substratum is yellowish brown very shaly silty clay loam to a depth of 60 inches or more.

Included with these soils in mapping are small areas of Wharton and Berks soils.

The permeability of these Gilpin and Rayne soils is moderate. In unlimed areas reaction is strongly acid to

extremely acid in the Gilpin soils and strongly acid to very strongly acid in the Rayne soils.

Most areas of these soils are in cropland and pasture. Some of the acreage is wooded.

The areas of these soils used for cultivated crops have a severe hazard of erosion. Growing cover crops, keeping crop residue on the surface, stripcropping, minimum tillage, and using winter cover crops, diversions, and grassed waterways help to control erosion. Adding crop residue and manure and fertilizer improves the fertility of the soil, reduces crusting, and increases water infiltration.

The use of proper stocking rates to maintain key plant species and the rotation of pasture are major pasture management concerns on these soils. Optimum production of pasture grasses requires maintenance of fertility through periodic applications of nutrients.

These soils are suitable for trees. Machine planting is practical in large areas. The rooting depth in the Gilpin soils is restricted by the depth to bedrock.

Slope and the depth to bedrock in the Gilpin soils limit these soils for some nonfarm uses, especially for onsite sewage disposal.

The capability subclass is IVe; woodland ordination symbol 2r.

GwB—Gilpin-Weikert channery silt loams, 3 to 8 percent slopes. This complex consists of gently sloping, well drained soils on uplands. The areas are irregularly shaped and range from 2 to 30 acres. The complex is about 60 percent moderately deep Gilpin soils, 30 percent shallow Weikert soils, and 10 percent other soils. The soils are so intermingled that it was not practical to map them separately.

Typically, the Gilpin soils have a surface layer of very dark grayish brown channery silt loam about 10 inches thick. The subsoil is yellowish brown, friable channery silty clay loam 18 inches thick. The substratum is light olive brown, friable very channery silt loam 10 inches thick. Light olive brown shale and siltstone bedrock is at a depth of 38 inches.

Typically, the Weikert soils have a surface layer of dark brown channery silt loam about 9 inches thick. The subsoil is yellowish brown, friable very channery silt loam 10 inches thick. Dark gray shale bedrock is at a depth of 19 inches.

Included with these soils in mapping are small areas of Berks and Blairton soils.

The permeability is moderate in the Gilpin soils and moderately rapid in the Weikert soils. The Gilpin soils are strongly acid to extremely acid, and the Weikert soils are strongly acid and very strongly acid.

Most areas of these soils are in cropland and pasture. Some of the acreage is wooded.

The areas of these soils used for cultivated crops have a moderate hazard of erosion. Growing cover crops, keeping crop residue on the surface, stripcropping, minimum tillage, and using winter cover crops, diversions, and grassed waterways help to control erosion. Adding crop residue and manure and fertilizer improves the fertility of the soil, reduces crusting, and increases water infiltration.

The use of proper stocking rates to maintain key plant species and the rotation of pastures are major pasture management concerns on these soils. Optimum production of pasture grasses requires maintenance of fertility through periodic applications of nutrients.

These soils are suitable for trees. Machine planting is practical in large areas. The rooting depth of trees is restricted by the depth to bedrock.

The main limitation of these soils for nonfarm uses, especially for onsite sewage disposal, is the depth to bedrock.

The capability subclass is IIe; woodland ordination symbol for the Gilpin part is 2o, for the Weikert part 4d.

GwC—Gilpin-Weikert channery silt loams, 8 to 15 percent slopes. This complex consists of sloping, well drained soils on uplands. The areas are irregularly shaped and range from 2 to 120 acres. The complex is about 60 percent moderately deep Gilpin soils, 30 percent shallow Weikert soils, and 10 percent other soils. The soils are so intermingled that it was not practical to map them separately.

Typically, the Gilpin soils have a surface layer of very dark grayish brown channery silt loam about 10 inches thick. The subsoil is yellowish brown, friable channery silty clay loam 18 inches thick. The substratum is light olive brown, friable very channery silt loam 10 inches thick. Light olive brown shale and siltstone bedrock is at a depth of 38 inches.

Typically, the Weikert soils have a surface layer of dark brown channery silt loam about 9 inches thick. The subsoil is yellowish brown, friable very channery silt loam 10 inches thick. Dark gray shale bedrock is at a depth of 19 inches.

Included with these soils in mapping are small areas of Berks and Blairton soils.

The permeability is moderate in the Gilpin soils and moderately rapid in the Weikert soils. The Gilpin soils are strongly acid to extremely acid, and the Weikert soils are strongly acid and very strongly acid.

Most areas of these soils are in cropland and pasture. Some of the acreage is wooded.

The areas of these soils used for cultivated crops have a severe hazard of erosion. Growing cover crops, keeping crop residue on the surface, stripcropping, minimum tillage, and using winter cover crops, diversions, and grassed waterways help to control erosion. Adding crop residue and manure and fertilizer improves the fertility of the soil, reduces crusting, and increases water infiltration.

The use of proper stocking rates to maintain key plant species and the rotation of pastures are major pasture

management concerns on these soils. Optimum production of pasture grasses requires maintenance of fertility through periodic applications of nutrients.

These soils are suitable for trees. Machine planting is practical in large areas. The rooting depth of trees is restricted by the depth to bedrock.

The main limitations of these soils for nonfarm uses, especially for onsite sewage disposal, are slope and the depth to bedrock.

The capability subclass is IIIe; woodland ordination symbol for the Gilpin part is 2o, for the Weikert part 4d.

GwD—Gilpin-Weikert channery silt loams, 15 to 25 percent slopes. This complex consists of moderately steep, well drained soils on uplands. The areas are irregularly shaped and range from 2 to 80 acres. The complex is about 60 percent moderately deep Gilpin soils, 30 percent shallow Weikert soils, and 10 percent other soils. The soils are so intermingled that it was not practical to map them separately.

Typically, the Gilpin soils have a surface layer of very dark grayish brown channery silt loam about 10 inches thick. The subsoil is yellowish brown, friable channery silty clay loam 18 inches thick. The substratum is light olive brown, friable very channery silt loam 10 inches thick. Light olive brown shale and siltstone bedrock is at a depth of 38 inches.

Typically, the Weikert soils have a surface layer of dark brown channery silt loam about 9 inches thick. The subsoil is yellowish brown, friable very channery silt loam 10 inches thick. Dark gray shale bedrock is at a depth of 19 inches.

Included with these soils in mapping are small areas of Berks and Blairton soils.

The permeability is moderate in the Gilpin soils and moderately rapid in the Weikert soils. The Gilpin soils are strongly acid to extremely acid, and the Weikert soils are strongly acid and very strongly acid.

Most areas of these soils are in cropland and pasture. Some of the acreage is wooded.

The areas of these soils used for cultivated crops have a severe hazard of erosion. Growing cover crops, keeping crop residue on the surface, stripcropping, minimum tillage, and using winter cover crops, diversions, and grassed waterways help to control erosion. Adding crop residue and manure and fertilizer improves the fertility of the soil, reduces crusting, and increases water infiltration.

The use of proper stocking rates to maintain key plant species and the rotation of pastures are major pasture management concerns on these soils. Optimum production of pasture grasses requires maintenance of fertility through periodic applications of nutrients.

These soils are suitable for trees, but slope is a limitation for equipment use and erosion is a hazard during harvesting. Machine planting is practical in large areas. The rooting depth of trees is restricted by the depth to bedrock.

Slope and the depth to bedrock limit these soils for nonfarm uses, especially for onsite sewage disposal.

The capability subclass is IVe; woodland ordination symbol for the Gilpin part is 2r, for the Weikert part 4d.

GWF—Gilpin-Weikert channery silt loams, 25 to 70 percent slopes. This complex consists of steep, well drained soils on uplands. The areas range from 3 to 140 acres and are irregularly shaped. The complex is about 60 percent moderately deep Gilpin soils, 30 percent shallow Weikert soils, and 10 percent other soils. The soils are so intermingled that it was not practical to map them separately.

Typically, the Gilpin soils have a surface layer of very dark grayish brown channery silt loam about 10 inches thick. The subsoil is yellowish brown, friable channery silty clay loam 18 inches thick. The substratum is light olive brown, friable very channery silt loam 10 inches thick. Light olive brown shale and siltstone bedrock is at a depth of 38 inches.

Typically, the Weikert soils have a surface layer of dark brown channery silt loam about 9 inches thick. The subsoil is yellowish brown, friable very channery silt loam 10 inches thick. Dark gray shale bedrock is at a depth of 19 inches.

Included with these soils in mapping are areas of Berks and Blairton soils.

The permeability is moderate in the Gilpin soils and moderately rapid in the Weikert soils. The Gilpin soils are strongly acid to extremely acid, and the Weikert soils are strongly acid and very strongly acid.

Slope and a severe erosion hazard make these soils generally unsuitable for farming. The soils are suitable for trees, and most of the acreage is wooded, but the rooting depth is restricted by the depth to bedrock. Slope limits the use of woodland planting and harvesting equipment, and the hazard of erosion is severe during harvesting.

Slope and the depth to bedrock also limit the soils for most nonfarm uses, especially for onsite sewage disposal.

The capability subclass is VIIe; woodland ordination symbol for the Gilpin part is 2r, for the Weikert part 4d.

HaB—Hazleton channery loam, 3 to 8 percent slopes. This soil is gently sloping, deep, and well drained. It is on uplands. The areas are irregular in shape and range from 2 to 160 acres.

Typically, the surface layer is black channery loam about 1 inch thick. The subsurface layer is gray channery loam 1 inch thick. The subsoil extends to a depth of 28 inches. The upper 6 inches is brownish yellow, friable channery loam. The lower 20 inches is yellowish brown, friable channery and very channery sandy loam. The

substratum is yellowish brown, loose very channery sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are a few areas of Laidig, Cookport, Gilpin, and Leetonia soils.

This Hazleton soil has moderately rapid to rapid permeability and moderate to low available water capacity. Surface runoff is slow. In unlimed areas reaction ranges from strongly acid to extremely acid throughout the soil.

Most areas of this soil are in cropland and pasture. Some of the acreage is wooded.

The areas of this soil used for cultivated crops have a moderate hazard of erosion. Growing cover crops, keeping crop residue on the surface, stripcropping, minimum tillage, and using winter cover crops, diversions, and grassed waterways help to control erosion. Adding crop residue and manure and fertilizer improves the fertility of the soil, reduces crusting, and increases water infiltration.

The use of proper stocking rates to maintain key plant species and the rotation of pastures are major pasture management concerns on this soil. Optimum production of pasture grasses requires maintenance of fertility through periodic applications of nutrients.

The soil is suitable for trees. Machine planting is practical in large areas.

Rock fragments in the soil and the moderately rapid to rapid permeability limit the soil for some nonfarm uses. The rate of permeability especially limits the soil for onsite sewage disposal.

The capability subclass is IIe; woodland ordination symbol 3o.

HaC—Hazleton channery loam, 8 to 15 percent slopes. This soil is sloping, deep, and well drained. It is on uplands. The areas are irregular in shape and range from 2 to 90 acres.

Typically, the surface layer is black channery loam about 1 inch thick. The subsurface layer is gray channery loam 1 inch thick. The subsoil extends to a depth of 28 inches. The upper 6 inches is brownish yellow, friable channery loam. The lower 20 inches is yellowish brown, friable channery and very channery sandy loam. The substratum is yellowish brown, loose very channery sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are a few areas of Laidig, Cookport, Gilpin, and Leetonia soils.

This Hazleton soil has moderately rapid to rapid permeability and moderate to low available water capacity. Surface runoff is slow. In unlimed areas reaction ranges from strongly acid to extremely acid throughout the soil.

Most areas of this soil are in cropland and pasture. Some areas are in woodland.

The areas of this soil used for cultivated crops have a severe hazard of erosion. Growing cover crops, keeping crop residue on the surface, stripcropping, minimum tillage, and using winter cover crops, diversions, and grassed waterways help to control erosion. Adding crop residue and manure and fertilizer improves the fertility of the soil, reduces crusting, and increases water infiltration.

The use of proper stocking rates to maintain key plant species and the rotation of pastures are the chief pasture management needs on this soil. Optimum production of pasture grasses requires maintenance of fertility through periodic applications of nutrients.

The soil is suitable for trees. Machine planting is practical in large areas.

Slope, stone fragments on and in the surface layer, and the moderately rapid to rapid permeability limit the soil for nonfarm uses. Slope and the rate of permeability especially limit onsite sewage disposal.

The capability subclass is IIIe; woodland ordination symbol 3o.

HaD—Hazleton channery loam, 15 to 25 percent slopes. This soil is moderately steep, deep, and well drained. It is on uplands. The areas are irregular in shape and range from 2 to 160 acres.

Typically, the surface layer is black channery loam about 1 inch thick. The subsurface layer is gray channery loam 1 inch thick. The subsoil extends to a depth of 28 inches. The upper 6 inches is brownish yellow, friable channery loam. The lower 20 inches is yellowish brown, friable channery and very channery sandy loam. The substratum is yellowish brown, loose very channery sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are a few areas of Laidig, Cookport, Gilpin, and Leetonia soils.

This Hazleton soil has moderately rapid to rapid permeability and moderate to low available water capacity. Surface runoff is slow. In unlimed areas reaction ranges from strongly acid to extremely acid throughout the soil.

Most areas of this soil are in cropland and pasture. Some of the acreage is wooded.

The areas of this soil used for cultivated crops have a severe hazard of erosion. Growing cover crops, stripcropping, minimum tillage, and using winter cover crops, diversions, and grassed waterways help to control erosion. Adding crop residue and manure and fertilizer improves the fertility of the soil, reduces crusting, and increases water infiltration.

The use of proper stocking rates to maintain key plant species and the rotation of pastures are the chief pasture management needs on this soil. Optimum production of pasture grasses requires maintenance of fertility through periodic applications of nutrients.

The soil is suitable for trees, but slope limits the use of equipment and erosion is a hazard during harvesting.

Slope, the moderately rapid to rapid permeability, and stone fragments in and on the surface layer limit the soil

for some nonfarm uses. Slope and the rate of permeability especially limit onsite sewage disposal.

The capability subclass is IVe; woodland ordination symbol 3r.

HbB—Hazleton very stony loam, 3 to 8 percent slopes. This soil is gently sloping, deep, and well drained. It is on uplands. The areas are irregular in shape and range from 2 to 100 acres. Stones that are 10 to 36 inches in diameter cover about 3 to 15 percent of the surface area.

Typically, the surface layer is black channery loam about 1 inch thick. The subsurface layer is gray channery loam 1 inch thick. The subsoil extends to a depth of 28 inches. The upper 6 inches is brownish yellow, friable channery loam. The lower 20 inches is yellowish brown, friable channery and very channery sandy loam. The substratum is yellowish brown, loose very channery sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are a few areas of Laidig, Cookport, Gilpin, and Leetonia soils.

This Hazleton soil has moderately rapid to rapid permeability and moderate to low available water capacity. Surface runoff is slow. In unlimed areas reaction ranges from strongly acid to extremely acid throughout the soil.

The stones on the surface make this soil generally unsuitable for farming. The soil is suitable for trees, and most of the acreage is wooded, but the stones on the surface interfere with mechanical planting.

The stony surface and the moderately rapid to rapid permeability limit this soil for some nonfarm uses, especially for onsite sewage disposal.

The capability subclass is VIs; woodland ordination symbol 3o.

HbD—Hazleton very stony loam, 8 to 25 percent slopes. This soil is sloping and moderately steep, deep, and well drained. It is on uplands. The areas are irregular in shape and range from 2 to 300 acres. Stones that are 10 to 36 inches in diameter cover about 3 to 15 percent of the surface area.

Typically, the surface layer is black channery loam about 1 inch thick. The subsurface layer is gray channery loam 1 inch thick. The subsoil extends to a depth of 28 inches. The upper 6 inches is brownish yellow, friable channery loam. The lower 20 inches is yellowish brown, friable channery and very channery sandy loam. The substratum is yellowish brown, loose very channery sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are a few areas of Laidig, Cookport, Gilpin, and Leetonia soils.

This Hazleton soil has moderately rapid to rapid permeability and moderate to low available water capacity. Surface runoff is medium. In unlimed areas reaction ranges from strongly acid to extremely acid throughout.

The stones on the surface make this soil generally unsuitable for farming. The soil is suitable for trees, and most of the acreage is wooded, but the stones on the surface interfere with mechanical planting.

The stony surface and the moderately rapid to rapid permeability limit this soil for some nonfarm uses, especially for onsite sewage disposal. Some areas are suitable for wildlife habitat and recreation.

The capability subclass is VIs; woodland ordination symbol 3r.

Hx—Hazleton extremely bouldery sandy loam. This soil is nearly level to steep, deep, and well drained. It is on uplands. The areas are irregular in shape and range from 2 to 40 acres. Slopes range from 0 to 35 percent. Large boulders cover about 50 to 90 percent of the surface area.

Typically, the surface layer is black channery loam about 1 inch thick. The subsurface layer is gray channery loam 1 inch thick. The subsoil extends to a depth of 28 inches. The upper 6 inches is brownish yellow, friable channery loam. The lower 20 inches is yellowish brown, friable channery and very channery sandy loam. The substratum is yellowish brown, loose very channery sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are areas where more than 90 percent of the surface is covered with stones and boulders. Also included are small areas of Cookport and Laidig soils.

This Hazleton soil has moderately rapid to rapid permeability and moderate to low available water capacity. Surface runoff is slow. In unlimed areas reaction ranges from strongly acid to extremely acid throughout the soil.

The boulders on the surface make this soil generally unsuitable for farming. The soil is suitable for trees, and most of the acreage is wooded, but the boulders interfere with mechanical planting.

This soil is limited for most nonfarm uses, including onsite sewage disposal. The main limitations are the stones on the surface, the moderately rapid to rapid permeability, and, in some areas, slope. A few areas are suitable for wildlife habitat and recreation.

The capability subclass is VIIs; woodland ordination symbol 3x.

LaB—Laidig loam, 3 to 8 percent slopes. This soil is gently sloping, deep, and well drained. It is on uplands. The areas are irregular in shape and range from 2 to 200 acres.

Typically, the surface layer is very dark grayish brown loam about 7 inches thick. The subsoil extends to a depth of 60 inches or more. The upper 21 inches is yellowish brown and strong brown, friable channery loam. The next 8 inches is strong brown, firm channery sandy clay loam. Brown and dark brown, firm and brittle channery heavy sandy loam is at a depth of 36 inches.

Included with this soil in mapping are a few areas of Cookport, Ernest, Leetonia, and Nolo soils.

This Laidig soil has moderately slow permeability and moderate available water capacity. Surface runoff is medium. In unlimed areas reaction ranges from strongly acid to extremely acid throughout the soil.

Most areas of this soil are in cropland and pasture. Some of the acreage is wooded.

The areas of this soil used for cultivated crops have a moderate hazard of erosion. Growing cover crops, keeping crop residue on the surface, stripcropping, minimum tillage, and using winter cover crops, diversions, and grassed waterways help to control erosion. Adding crop residue and manure and fertilizer improves the fertility of the soil, reduces crusting, and increases water infiltration.

The use of proper stocking rates to maintain key plant species, prevention of overgrazing, and the rotation of pastures are major pasture management concerns on this soil. Optimum production of pasture grasses requires maintenance of fertility through periodic applications of nutrients.

This soil is suitable for trees. Machine planting is practical in large areas.

The moderately slow permeability of the soil limits onsite sewage disposal.

The capability subclass is IIe; woodland ordination symbol 2o.

LaC—Laidig loam, 8 to 15 percent slopes. This soil is sloping, deep, and well drained. It is on broad ridges and side slopes. The areas are irregular in shape and range from 2 to 100 acres.

Typically, the surface layer is very dark grayish brown loam about 7 inches thick. The subsoil extends to a depth of 60 inches or more. The upper 21 inches is yellowish brown and strong brown, friable channery loam. The next 8 inches is strong brown, firm channery sandy clay loam. Brown and dark brown firm and brittle channery heavy sandy loam is at a depth of 36 inches.

Included with this soil in mapping are a few areas of Cookport, Ernest, Leetonia, and Nolo soils.

This Laidig soil has moderately slow permeability and moderate available water capacity. Surface runoff is rapid. In unlimed areas reaction ranges from strongly acid to extremely acid throughout the soil.

Most areas of this soil are in cropland and pasture. Some of the acreage is wooded.

The areas of this soil used for cultivated crops have a severe hazard of erosion. Growing cover crops, keeping crop residue on the surface, stripcropping, minimum tillage, winter cover crops, diversions, and grassed waterways help to control erosion. Adding crop residue and fertilizer and manure to the soil improves the fertility, reduces crusting, and increases water infiltration.

The use of proper stocking rates to maintain key plant species, the rotation of pastures, and prevention of overgrazing are major pasture management concerns on this soil. Optimum production of pasture grasses requires maintenance of fertility through periodic applications of nutrients.

This soil is suitable for trees. Machine planting is practical in large areas.

Slope and the moderately slow permeability limit this soil for some nonfarm uses, especially for onsite sewage disposal.

The capability subclass is IIIe; woodland ordination symbol 2o.

LDF—Laidig soils, 25 to 70 percent slopes. This unit consists of steep soils on side slopes. The areas are irregular in shape and range from 5 to 280 acres. Stones that are 10 to 36 inches in diameter cover 3 to 15 percent of the surface of some areas of the unit.

Typically, the surface layer is very dark grayish brown loam about 7 inches thick. The subsoil extends to a depth of 60 inches or more. The upper 21 inches is yellowish brown and strong brown, friable channery loam. The next 8 inches is strong brown, firm channery sandy clay loam. Brown and dark brown, firm and brittle channery heavy sandy loam is at a depth of 36 inches.

Included with these soils in mapping are a few areas of Cookport, Ernest, Leetonia, Hazleton, Gilpin, and Weikert soils.

These Laidig soils have moderately slow permeability and moderate available water capacity. Surface runoff is very rapid. In unlimed areas reaction ranges from strongly acid to extremely acid throughout the soils.

Slope and the stones on the surface make these soils unsuitable for farming and most nonfarm uses. The moderately slow permeability is an additional limitation for onsite sewage disposal. The soils are suitable for trees, and much of the acreage is wooded, but the slope and stones on the surface interfere with the use of harvesting and planting equipment.

The capability subclass is VIIe; woodland ordination symbol 2r.

LkB—Leck Kill silt loam, 3 to 8 percent slopes. This soil is gently sloping, deep, and well drained. It is on hillsides and benches. The areas are irregular in shape and range from 4 to 25 acres.

Typically, the surface layer is dark reddish gray silt loam 7 inches thick. The subsoil is reddish brown, firm shaly silt loam 29 inches thick. The substratum is reddish brown, firm very shaly silt loam 9 inches thick. Reddish brown shale bedrock is at a depth of 45 inches.

Included with this soil in mapping are a few areas of Hazleton, Laidig, and Albrights soils.

This Leck Kill soil has moderate to moderately rapid permeability and moderate available water capacity. Surface runoff is medium. In unlimed areas reaction ranges from neutral to very strongly acid in the surface

layer and upper part of the subsoil. It is very strongly acid to medium acid in the substratum.

Most areas of this soil are in woodland. Some small areas are used for farming, building sites, and recreation.

The areas of this soil used for cultivated crops have a moderate erosion hazard. Stripcropping, grassed waterways, diversions, and cover crops help to control erosion. The soil responds well to fertilizers.

The use of proper stocking rates to maintain key plant species and the rotation of pastures are the chief pasture management needs on this soil. Optimum production of pasture grasses requires maintenance of fertility through periodic applications of nutrients.

The soil is suitable for trees. Machine planting is practical in large areas.

The moderately rapid permeability and depth to bedrock limit this soil for some nonfarm uses, mainly for onsite sewage disposal.

The capability subclass is IIe; woodland ordination symbol 3o.

LkC—Leck Kill silt loam, 8 to 15 percent slopes. This soil is sloping, deep, and well drained. It is on hillsides and ridges. The areas are irregular in shape and range from 2 to 50 acres.

Typically, the surface layer is dark reddish gray silt loam 7 inches thick. The subsoil is reddish brown, firm shaly silt loam 29 inches thick. The substratum is reddish brown, firm very shaly silt loam 9 inches thick. Reddish brown shale bedrock is at a depth of 45 inches.

Included with this soil in mapping are a few areas of Hazleton, Laidig, and Albrights soils.

This Leck Kill soil has moderate to moderately rapid permeability and moderate available water capacity. Surface runoff is rapid. In unlimed areas reaction ranges from neutral to very strongly acid in the surface layer and upper part of the subsoil. It is very strongly acid to medium acid in the substratum.

Most areas of this soil are in woodland. Some small areas are used for farming, building sites, and recreation.

The areas of this soil used for cultivated crops have a severe erosion hazard. Stripcropping, grassed waterways, diversions, and cover crops help to control erosion. The soil responds well to fertilizers.

The use of proper stocking rates to maintain key plant species and the rotation of pastures are the chief pasture management needs on this soil. Optimum production of pasture grasses requires maintenance of fertility through periodic applications of nutrients.

The soil is suitable for trees. Machine planting is practical in large areas.

Slope, the depth to bedrock, and the moderately rapid permeability limit this soil for some nonfarm uses, especially for onsite sewage disposal.

The capability subclass is IIIe; woodland ordination symbol 3o.

LkD—Leck Kill silt loam, 15 to 25 percent slopes. This soil is moderately steep, deep, and well drained. It is on hillsides and ridges. The areas are irregular in shape and range from 4 to 40 acres.

Typically, the surface layer is dark reddish gray silt loam 7 inches thick. The subsoil is reddish brown, firm shaly silt loam 29 inches thick. The substratum is reddish brown, firm very shaly silt loam 16 inches thick. Reddish brown shale bedrock is at a depth of 45 inches.

Included with this soil in mapping are a few areas of Hazleton, Laidig, and Albrights soils.

This Leck Kill soil has moderate to moderately rapid permeability and moderate available water capacity. Surface runoff is very rapid. In unlimed areas reaction ranges from neutral to very strongly acid in the surface layer and upper part of the subsoil. It is very strongly acid to medium acid in the substratum.

Most areas of this soil are in woodland. Some small areas are used for farming, building sites, and recreation.

The areas of this soil used for cultivated crops have a very severe erosion hazard. Stripcropping, grassed waterways, diversions, and cover crops help to control erosion. The soil responds well to fertilizers.

The use of proper stocking rates to maintain key plant species and the rotation of pastures are the chief pasture management needs on this soil. Optimum production of pasture grasses requires maintenance of fertility through periodic applications of nutrients.

This soil is suitable for trees. Slope limits the use of equipment, but machine planting is practical in large areas.

Slope, the moderate to moderately rapid permeability, and the depth to bedrock limit this soil for many nonfarm uses, especially for onsite sewage disposal.

The capability subclass is IVe; woodland ordination symbol 3r.

LtB—Leetonia very stony loamy sand, 3 to 8 percent slopes. This soil is gently sloping, deep, and excessively drained to well drained. It is on ridgetops, knolls, and benches. The areas are irregular in shape and range from 20 to 400 acres. Stones that are 10 to 36 inches in diameter cover 3 to 15 percent of the surface area.

Typically, the surface layer is black flaggy loamy sand about 1 inch thick. The subsurface layer is light brownish gray very flaggy loamy sand 10 inches thick. The subsoil extends to a depth of 60 inches. The upper 11 inches is reddish brown and dark reddish brown very channery loamy sand and sandy loam. The lower 38 inches is yellowish brown and brown, friable very flaggy and flaggy sandy loam. The substratum, at a depth of more than 60 inches, is light yellowish brown and brownish yellow channery loamy sand and very flaggy sandy loam.

Included with this soil in mapping are a few areas of moderately well drained Cookport soils, poorly drained Nolo soils, and well drained Laidig soils.

This Leetonia soil has moderately rapid permeability and low to very low available water capacity. Surface runoff is very slow. In unlimed areas reaction is extremely acid and strongly acid throughout the soil.

The stones on the surface make this soil generally unsuitable for farming. Most of the areas are wooded, but the rate of seedling mortality is high on the soil and the stones interfere with mechanical planting.

The stones on and in the soil and the moderately rapid permeability are the main limitations for nonfarm uses, especially for onsite sewage disposal.

The capability subclass is VIs; woodland ordination symbol 5f.

NoB—Nolo very stony sandy loam, 0 to 8 percent slopes. This soil is nearly level to gently sloping, deep, and poorly drained. It is on ridgetops, benches, and along water courses on uplands. The areas are irregular in shape and range from 3 to 400 acres. Stones that are 10 to 36 inches in diameter cover 3 to 15 percent of the surface area.

Typically, the surface layer is black sandy loam about 2 inches thick. The subsurface layer is light brownish gray sandy loam about 4 inches thick. The subsoil is about 44 inches thick. The upper 3 inches is mottled, light gray, firm channery loam. The next 10 inches is mottled, gray, firm channery clay loam. The lower 31 inches is mottled, gray, firm and brittle channery sandy clay loam. The substratum is grayish brown, firm channery loam to a depth of 60 inches or more.

Included with this soil in mapping are a few areas of Cookport and Ernest soils.

This Nolo soil has slow permeability and moderate available water capacity. Surface runoff is slow. In unlimed areas reaction is very strongly acid and extremely acid throughout the soil. The depth to the firm and brittle part of the subsoil ranges from 16 to 30 inches. A high water table is between the surface and a depth of 6 inches.

The stones on the surface make this soil generally unsuitable for farming. The soil is suitable for trees, and most of the acreage is wooded, but the firm and brittle layer in the subsoil and the seasonal high water table restrict the rooting depth. Woodland harvesting is delayed for long periods on this soil during the wet season.

The stones on the surface, the high water table, and the slow permeability limit this soil for most nonfarm uses. The high water table and slow permeability especially limit onsite sewage disposal.

The capability subclass is VIIs; woodland ordination symbol 3w.

Ph—Philo silt loam. This soil is nearly level, deep, and moderately well drained. It is along major streams and rivers. The areas are irregular in shape and range from 3 to 90 acres.

Typically, the surface layer is very dark grayish brown silt loam about 5 inches thick. The subsoil is yellowish brown and strong brown, friable silt loam 21 inches thick. The substratum extends to a depth of 60 inches or more. It is light brownish gray, friable fine sandy loam to a depth of 42 inches and stratified sand and gravel at a depth of more than 42 inches.

Included with this soil in mapping are a few areas of Pope and Atkins soils.

This Philo soil has moderate to moderately slow permeability and high available water capacity. Surface runoff is slow. In unlimed areas reaction ranges from medium acid to very strongly acid throughout the soil. A seasonal high water table is at a depth of 18 to 36 inches.

Most areas of this soil are in cropland and pasture. Some of the acreage is wooded.

The areas of this soil used for cultivated crops have a slight hazard of erosion. The soil responds well to fertilizers. Flooding is a hazard on this soil. Keeping natural drainageways open and using surface and subsurface drains where adequate outlets are available help to improve drainage.

The use of proper stocking rates to maintain key plant species, rotation of pastures, and deferred grazing during wet periods are major pasture management concerns on this soil. Grazing when the soil is too wet causes surface compaction, excessive runoff, and poor tilth. Optimum production of pasture grasses requires maintenance of fertility through periodic applications of nutrients.

The soil is suitable for trees. Machine planting is practical in large areas.

The hazard of flooding and the seasonal high water table limit this soil for most nonfarm uses.

The capability subclass is IIw; woodland ordination symbol 1w.

Po—Pope silt loam. This soil is nearly level, deep, and well drained. It is on the flood plains of major streams and rivers. The areas are irregular in shape and range from 3 to 50 acres.

Typically, the surface layer is brown silt loam about 9 inches thick. The subsoil is strong brown and yellowish brown, friable sandy loam about 21 inches thick. The substratum is yellowish brown, friable fine sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are a few areas of Philo and Atkins soils.

This Pope soil has moderate to moderately rapid permeability and high available water capacity. Surface runoff is slow. In unlimed areas reaction ranges from strongly acid to extremely acid throughout the soil.

Most areas of this soil are in cropland and pasture. Some of the acreage is wooded.

The soil is well suited to cultivated crops, and crops respond well to fertilizers. However, flooding is a hazard on this soil.

The use of proper stocking rates to maintain key plant species and the rotation of pastures are major pasture management concerns on this soil. Optimum production of pasture grasses requires maintenance of fertility through periodic applications of nutrients.

The soil is suitable for trees. Machine planting is practical in large areas.

The hazard of flooding is the major limit of this soil for nonfarm uses, especially for onsite waste disposal.

The capability class is I; woodland ordination symbol 2o.

RaB—Rayne silt loam, 3 to 8 percent slopes. This soil is gently sloping, deep, and well drained. It is on uplands. The areas are irregular in shape and range from 3 to 50 acres.

Typically, the surface layer is dark brown silt loam about 8 inches thick. The subsoil is yellowish brown, friable and firm silty clay loam and shaly silty clay loam 32 inches thick. The substratum is yellowish brown, firm very shaly silty clay loam to a depth of 60 inches.

Included with this soil in mapping are a few areas of Gilpin and Wharton soils.

This Rayne soil has moderate permeability and moderate to high available water capacity. Surface runoff is medium. In unlimed areas reaction is strongly acid and very strongly acid throughout the soil.

Most areas of this soil are in cropland and pasture. Some of the acreage is wooded.

The areas of this soil used for cultivated crops have a moderate hazard of erosion. Minimum tillage, diversions, grassed waterways, and stripcropping help to reduce runoff and control erosion. Crops respond well to fertilizers. Growing cover crops, keeping crop residue on the surface, and including grasses in the cropping system help to maintain the organic matter content and tilth.

The use of proper stocking rates to maintain key plant species and the rotation of pastures are major pasture management concerns on this soil. Optimum production of pasture grasses requires maintenance of fertility through periodic applications of nutrients.

The soil is suitable for trees. Machine planting is practical in large areas.

This soil has few limitations for most nonfarm use. In some areas, however, bedrock is at a depth of 3-1/2 to 6 feet, limiting use of the soil for onsite waste disposal.

The capability subclass is IIe; woodland ordination symbol 2o.

RaC—Rayne silt loam, 8 to 15 percent slopes. This soil is sloping, deep, and well drained. It is on uplands. The areas are irregular in shape and range from 3 to 20 acres.

Typically, the surface layer is dark brown silt loam about 8 inches thick. The subsoil is yellowish brown, friable and firm silty clay loam and shaly silty clay loam 32 inches thick. The substratum is yellowish brown, firm very shaly silty clay loam to a depth of 60 inches.

Included with this soil in mapping are a few areas of Gilpin and Wharton soils.

This Rayne soil has moderate permeability and moderate to high available water capacity. Surface runoff is rapid. In unlimed areas reaction is strongly acid and very strongly acid throughout the soil.

Most areas of this soil are in cropland and pasture (fig. 6). Some of the acreage is wooded.

The areas of this soil used for cultivated crops have a severe hazard of erosion. Minimum tillage, diversions, grassed waterways, and stripcropping help to control erosion. Growing cover crops, keeping crop residue on the surface, and including grasses in the cropping system are ways of maintaining organic matter content.

The use of proper stocking rates to maintain key plant species and the rotation of pastures are major pasture management concerns on this soil. Optimum production of pasture grasses requires maintenance of fertility through periodic applications of nutrients.

The soil is suitable for trees. Machine planting is practical in large areas.

Slope is the major limitation of this soil for most nonfarm uses. In some areas bedrock is at a depth of 3-1/2 to 6 feet, limiting use for onsite waste disposal and excavations.

The capability subclass is IIIe; woodland ordination symbol 2o.

RaD—Rayne silt loam, 15 to 25 percent slopes. This soil is moderately steep, deep, and well drained. It is on uplands. The areas are irregular in shape and range from 3 to 60 acres.

Typically, the surface layer is dark brown silt loam about 8 inches thick. The subsoil is yellowish brown, friable and firm silty clay loam and shaly silty clay loam 32 inches thick. The substratum is yellowish brown, firm very shaly silty clay loam to a depth of 60 inches.

Included with this soil in mapping are a few areas of Gilpin and Wharton soils.

This Rayne soil has moderate permeability and moderate to high available water capacity. Surface runoff is rapid. In unlimed areas reaction is strongly acid and very strongly acid throughout the soil.

Most areas of this soil are in cropland and pasture. Some of the acreage is wooded.

The areas of this soil used for cultivated crops have a severe hazard of erosion. Minimum tillage, diversions, grassed waterways, and stripcropping help to control erosion. Growing cover crops, keeping crop residue on the surface, and including grasses in the cropping system are ways of maintaining organic matter content.

The use of proper stocking rates to maintain key plant species and the rotation of pastures are major pasture management concerns on this soil. Optimum production

Figure 6.—An area of Rayne silt loam, 8 to 15 percent slopes.

of pasture grasses requires maintenance of fertility through periodic applications of nutrients.

The soil is suitable for trees. Slope restricts the use and selection of equipment. Machine planting is practical in large areas.

Slope is the main limitation of this soil for nonfarm uses. In some areas bedrock is at a depth of 3-1/2 to 6 feet, limiting onsite waste disposal.

The capability subclass is IVe; woodland ordination symbol 2r.

UDC—Udorthents, strip mine, sloping. This unit consists of a mixture of soil and rock material from strip-mined areas. The depth of the material is generally between 10 and 60 inches. The areas are irregular in shape and range from 3 to 40 acres. Slopes range from 8 to 25 percent.

Included with this unit in mapping are small areas of soils on uplands. The most common of these are Gilpin, Wharton, Cavode, Cookport, Ernest, Rayne, and Hazleton soils. Also included are small quarries and pits.

The material in this unit is excessively drained to somewhat poorly drained. Permeability ranges from rapid to slow. The available water capacity is very low to low. Reaction is extremely acid to slightly acid throughout.

Slope, depth to bedrock, a seasonal high water table, and the high content of rock fragments limit this unit for most uses. Onsite investigation of this unit is needed to determine its potential and limitations for a specific use.

This unit is not assigned to a capability subclass or woodland ordination symbol.

UDF—Udorthents, strip mine, steep. This unit consists of a mixture of soil and rock material from strip-

mined areas. The depth of the material is generally between 10 and 60 inches. The areas are irregular in shape and range from 1 to 80 acres. Slopes range from 25 to 75 percent.

Included with this unit in mapping are small areas of soils on uplands. The most common of these are Gilpin, Wharton, Cavode, Cookport, Ernest, Rayne, and Hazleton soils. Also included are small quarries and pits.

The material in this unit is excessively drained to somewhat poorly drained. Permeability ranges from rapid to slow. The available water capacity is very low to low. Reaction is extremely acid to slightly acid throughout the material.

Slope, depth to bedrock, a seasonal high water table, and the high content of rock fragments limit this unit for most uses. Onsite investigation of the unit is needed to determine its potential and limitations for a specific use.

This unit is not assigned to a capability subclass or woodland ordination symbol.

URB—Urban land-Udorthents complex, gently sloping. This complex consists of areas that are covered by such structures as buildings, parking lots, and industrial facilities and areas where the soils have been altered by grading. The areas of the unit range from 5 to 30 acres. Slopes range from 0 to 8 percent.

This unit is about 60 percent urbanized areas; 30 percent Udorthents, which consist of a mixture of soil and rock materials 10 to 60 inches deep; and 10 percent other soils. The urbanized areas and Udorthents are so intermingled that it was not practical to map them separately.

Included with this unit in mapping are small areas of Gilpin, Berks, Wharton, Rayne, and Philo soils.

Udorthents are excessively drained to somewhat poorly drained. Permeability ranges from rapid to slow. The available water capacity is very low to low. The unlimed areas are extremely acid to slightly acid throughout.

Onsite investigation is needed to determine the potential and limitations of this unit for a specific use.

This unit is not assigned to a capability subclass or woodland ordination symbol.

URC—Urban land-Udorthents complex, sloping. This complex consists of areas that are covered by such structures as buildings, parking lots, and industrial facilities and areas where the soils have been altered by grading. The areas of the unit range from 5 to 30 acres. Slopes range from 8 to 25 percent.

This unit is about 60 percent urbanized areas; 30 percent Udorthents, which consist of a mixture of soil and rock material 10 to 60 inches deep; and 10 percent other soils. The urbanized areas and Udorthents are so intermingled that it was not practical to map them separately.

Included with this unit in mapping are small areas of Gilpin, Wharton, Rayne, Philo, and Berks soils.

Udorthents are excessively drained to somewhat poorly drained. Permeability ranges from rapid to slow. The available water capacity is very low to low. The unlimed areas are extremely acid to slightly acid throughout.

Onsite investigation is needed to determine the potential and limitations of this unit for a specific use.

This unit is not assigned to a capability subclass or woodland ordination symbol.

WaB—Wharton silt loam, 3 to 8 percent slopes. This soil is gently sloping, deep, and moderately well drained. It is on uplands. The areas are irregular in shape and range from 2 to 240 acres.

Typically, the surface layer is very dark brown silt loam about 3 inches thick. The subsoil is 43 inches thick. The upper 23 inches is yellowish brown and strong brown, friable and firm silt loam and silty clay loam. The lower 20 inches is grayish brown and pale brown, firm and friable silty clay loam. The substratum is brown, friable very shaly silt loam to a depth of 60 inches or more.

Included with this soil in mapping are a few areas of Gilpin and Cavode soils.

This Wharton soil has slow or moderately slow permeability and moderate to high available water capacity. Surface runoff is medium. In unlimed areas reaction is strongly acid or very strongly acid in the surface layer and upper part of the subsoil. It is very strongly acid or extremely acid in the substratum. A seasonal high water table is at a depth of 18 to 36 inches.

Most areas of this soil are in cropland and pasture. Some of the acreage is wooded.

The areas of this soil used for cultivated crops have a moderate hazard of erosion. Minimum tillage, diversions, grassed waterways, and stripcropping help to reduce runoff and control erosion. Growing cover crops, keeping crop residue on the surface, and including hay in the cropping system are ways of maintaining the organic matter content and tilth. Crops respond well to fertilizers.

The use of proper stocking rates to maintain key plant species is a major pasture management concern on this soil. Grazing when the soil is too wet causes compaction, excessive runoff, and poor tilth. Optimum production of pasture grasses requires maintenance of fertility through periodic applications of nutrients.

The soil is suitable for trees. Machine planting is practical in large areas.

A seasonal high water table and the moderately slow or slow permeability limit this soil for nonfarm uses, especially for onsite sewage disposal.

The capability subclass is IIe; woodland ordination symbol 2o.

WaC—Wharton silt loam, 8 to 15 percent slopes. This soil is sloping, deep, and moderately well drained. It is on uplands. The areas are irregular in shape and range from 3 to 80 acres.

Typically, the surface layer is very dark brown silt loam about 3 inches thick. The subsoil is about 43 inches thick. The upper 23 inches is yellowish brown and strong brown, friable and firm silt loam and silty clay loam. The lower 20 inches is grayish brown and pale brown, firm and friable silty clay loam. The substratum is brown, friable, very shaly silt loam to a depth of 60 inches or more.

Included with this soil in mapping are a few areas of Gilpin and Cavode soils.

This Wharton soil has slow or moderately slow permeability and moderate to high available water capacity. Surface runoff is rapid. In unlimed areas reaction is strongly acid or very strongly acid in the surface layer and upper part of the subsoil. It is very strongly acid or extremely acid in the substratum. A seasonal high water table is at a depth of 18 to 36 inches.

Most areas of this soil are in cropland and pasture. Some of the acreage is wooded.

The areas of this soil used for cultivated crops have a severe hazard of erosion. Minimum tillage, diversions, grassed waterways, and stripcropping help to reduce runoff and control erosion. Growing cover crops, keeping crop residue on the surface, and including hay in the cropping system are ways of maintaining the organic matter content and tilth. Crops respond well to fertilizers.

The use of proper stocking rates to maintain key plant species is a major pasture management concern on this soil. Grazing when soil is too wet causes compaction, excessive runoff, and poor tilth. Optimum production of pasture grasses requires maintenance of fertility through periodic applications of nutrients.

The soil is suitable for trees. Machine planting is practical in large areas.

The slow or moderately slow permeability, slope, and the seasonal high water table limit this soil for nonfarm uses, especially for onsite sewage disposal.

The capability subclass is IIIe; woodland ordination symbol 2r.

WgC—Wharton-Gilpin silt loams, 8 to 15 percent slopes. This complex consists of sloping soils on uplands. The areas are irregular in shape and range from 5 to 300 acres. The complex is about 60 percent deep, moderately well drained Wharton soils; 30 percent moderately deep, well drained Gilpin soils; and 10 percent other soils. The Wharton and Gilpin soils are so intermingled that it was not practical to map them separately.

Typically, the surface layer of the Wharton soils is very dark brown silt loam about 3 inches thick. The subsoil is 43 inches thick. The upper 23 inches is yellowish brown and strong brown, friable and firm silt loam and silty clay loam. The lower 20 inches is grayish brown and pale brown, firm and friable silty clay loam. The substratum is brown, friable very shaly silt loam to a depth of 60 inches.

Typically, the Gilpin soils have a surface layer of very dark grayish brown silt loam about 10 inches thick. The subsoil is yellowish brown, friable channery silty clay loam 18 inches thick. The substratum is light olive brown, friable very channery silt loam 10 inches thick. Light olive brown shale and siltstone bedrock is at a depth of 38 inches.

Included with these soils in mapping are areas of Rayne and Cavode soils.

The Wharton soils have moderately slow to slow permeability and moderate to high available water capacity. Runoff is rapid. In unlimed areas of the Wharton soils the surface layer and upper part of the subsoil are strongly acid to very strongly acid. A seasonal high water table is at a depth of 18 to 36 inches. The substratum ranges from very strongly acid to extremely acid.

The Gilpin soils have moderate permeability and moderate available water capacity. Runoff is rapid. The Gilpin soils are strongly acid to extremely acid throughout.

Most areas of these soils are in cropland and pasture. Some of the acreage is wooded.

The areas of these soils used for cultivated crops have a severe hazard of erosion. Growing cover crops, keeping crop residue on the surface, stripcropping, minimum tillage, and using diversions and grassed waterways help prevent erosion. Adding crop residue and manure and fertilizer to the soils improves fertility, reduces crusting, and increases water infiltration.

The use of proper stocking rates to maintain key plant species is a major pasture management concern on these soils. Grazing when the soils are too wet causes surface compaction, excessive runoff, and poor tilth. Optimum production of pasture grasses requires maintenance of fertility through periodic applications of nutrients.

These soils are suitable for trees. Machine planting is practical in large areas.

Slope, a seasonal high water table in the Wharton soils, and bedrock at a depth of 20 to 40 inches in the Gilpin soils are the main limitations of this complex for nonfarm uses, especially for onsite sewage disposal.

The capability subclass is IIIe; woodland ordination symbol for the Wharton part is 2r, for the Gilpin part 2o.

WgD—Wharton-Gilpin silt loams, 15 to 25 percent slopes. This complex consists of moderately steep soils on uplands. The areas are irregular in shape and range from 5 to 160 acres. The complex is about 60 percent deep, moderately well drained Wharton soils; 30 percent moderately deep, well drained Gilpin soils; and 10

percent other soils. The Wharton and Gilpin soils are so intermingled that it was not practical to map them separately.

Typically, the surface layer of the Wharton soils is very dark brown silt loam about 3 inches thick. The subsoil is 43 inches thick. The upper 23 inches is yellowish brown and strong brown, friable and firm silt loam and silty clay loam. The lower 20 inches is grayish brown and pale brown, firm and friable silty clay loam. The substratum is brown, friable very shaly silt loam to a depth of 60 inches.

Typically, the Gilpin soils have a surface layer of very dark grayish brown silt loam about 10 inches thick. The subsoil is yellowish brown, friable channery silty clay loam 18 inches thick. The substratum is light olive brown, friable very channery silt loam 10 inches thick. Light olive brown shale and siltstone bedrock is at a depth of 38 inches.

Included with these soils in mapping are areas of Rayne and Cavode soils.

The Wharton soils have moderately slow to slow permeability and moderate to high available water capacity. Runoff is rapid. In unlimed areas of the Wharton soils the surface layer and upper part of the subsoil are strongly acid to very strongly acid. A seasonal high water table is at a depth of 18 to 36 inches. The substratum ranges from very strongly acid to extremely acid.

The Gilpin soils have moderate permeability and moderate available water capacity. Runoff is rapid. The Gilpin soils are strongly acid to extremely acid throughout.

Much of the acreage of these soils is used for pasture. Some areas are wooded.

If these soils are used for cultivated crops, the hazard of erosion is severe. Growing cover crops, keeping crop residue on the surface, stripcropping, minimum tillage, and using diversions and grassed waterways help prevent excessive erosion. Adding crop residue and manure and fertilizer to the soils improves fertility, reduces crusting, and increases water infiltration.

The use of proper stocking rates to maintain key plant species is a major pasture management concern on these soils. Grazing when soils are too wet causes surface compaction, excessive runoff, and poor tilth. Optimum production of pasture grasses requires maintenance of fertility through periodic applications of nutrients.

The soils are suitable for trees. Machine planting is practical in large areas.

Slope, the seasonal high water table in the Wharton soils, and bedrock at a depth of 20 to 40 inches in the Gilpin soils are the main limitations of this complex for nonfarm uses, especially for onsite sewage disposal.

The capability subclass is IVe; woodland ordination symbol 2r.

use and management of the soils

This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help avoid soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavior characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis in predicting soil behavior.

Information in this section can be used to plan the use and management of soils for crops and pasture; as woodland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreation facilities; and for wildlife habitat. It can be used to identify the potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in all or part of the survey area. The survey can help planners to maintain or create a land use pattern in harmony with the natural soil.

Contractors can use this survey to locate sources of sand and gravel, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

crops and pasture

John C. Spitzer, conservation agronomist, Soil Conservation Service, assisted in preparing this section.

General management needed for crops and pasture is suggested in this section. The crops or pasture plants best suited to the soils, including some not commonly grown in the survey area, are identified; the system of land capability classification used by the Soil Conservation Service is explained; and the estimated yields of the main crops and hay and pasture plants are listed for each soil.

Planners of management systems for individual fields or farms should consider the detailed information given in the description of each soil under "Detailed soil map units." Specific information can be obtained from the local office of the Soil Conservation Service or the Cooperative Extension Service.

Farmland covered 76,792 acres in Cambria County in 1975, according to the Conservation Needs Inventory. Of this total, 7,000 acres was used for permanent pasture, 12,200 acres for corn, 11,100 acres for small grain, 23,000 acres for alfalfa and other hay, 200 acres for orchards, 3,030 acres for vegetables, 2,900 acres for potatoes, and the rest for miscellaneous uses.

Soil erosion is the major management concern on most of the cropland and pasture in Cambria County. The Albrights, Cookport, Ernest, Hazleton, Laidig, Leck Kill, and Rayne soils, for instance, are among the most productive in the county, but they are highly susceptible to erosion. Unchecked soil erosion may result in sediment deposition in streams and reservoirs, pollution of streams, and generally reduced water quality. Conservation practices are needed on almost all soils to reduce the hazard of erosion and to maintain or increase production.

A loss of topsoil by erosion is the main cause of reduced production, especially in soils that are shallow or moderately deep to bedrock, soils with a firm and brittle layer in the subsoil, and soils with low available water capacity. Weikert and Berks soils, for example, are shallow and moderately deep and have low available water capacity. Cookport, Brinkerton, and Ernest soils are examples of soils with a firm and brittle layer in the subsoil.

On many sloping, stony soils, such as some Hazleton soils, preparing a good seedbed and tilling are difficult because the original surface layer has been eroded, leaving a high content of stone fragments on the surface.

Conservation and erosion-control practices provide protective cover, reduce runoff and sedimentation, and increase soil infiltration. Cropping systems that maintain a plant cover add to the productivity of the soils. Deferred grazing and the use of grasses and legumes help to reduce erosion, provide nitrogen, and improve tilth in areas used for pasture and hay. Contour farming,

terracing, minimum tillage, using cover crops, and returning crop residue to the soil help to increase infiltration and reduce erosion in areas used for cultivated crops.

The use of terraces is limited on soils with steep and irregular slopes, but the use of terraces and diversions, where practical, reduces the length of slopes and reduces runoff and erosion. Deep, well drained soils with moderate but uniform slopes, such as Hazleton, Laidig, Leck Kill, and Rayne soils, are generally suitable for terraces and diversions. Soils that are uniformly sloping are also suitable for contour farming and stripcropping, practices that are common in this survey area.

Some soils in the county are so poorly drained and thus so wet that crop production is not practical without artificial drainage. Examples are Armagh and Nolo soils. Some other soils, such as Cavode soils, are not so poorly drained but are so wet that crop damage results during most years unless artificial drainage is applied. The soils in Cambria County that require drainage cover about 59,000 acres. In addition, some small, wet areas are within drainageways and swales in the county.

The design of surface and subsurface drainage systems varies with the kind of soil. A combination of surface drainage and tile drainage is usually needed for poorly drained soils that are being intensively farmed. Ernest, Albrights, Cookport, and Wharton are examples of such soils. Drains must be more closely spaced in these soils, which have slow permeability, than in others that are more permeable. In addition, finding adequate outlets for tile drainage systems is often difficult.

Fertility is naturally low in many soils in the survey area, and many soils on uplands are strongly acid. Such soils require applications of lime and fertilizer. Many soils used for crop production in the survey area have a low content of organic matter. Intensive rainfall on these soils usually results in crusting of the surface, which reduces infiltration and increases runoff. Regular additions of crop residue, manure, and other organic material can help to improve tilth and reduce crusting.

Crusting during winter and spring also results from fall plowing of light-colored soils with a surface layer of silt loam. Many soils are nearly as dense and hard at planting time after fall plowing as they were before they were plowed. Further, sloping soils are subject to accelerated erosion if they are plowed in the fall.

Corn and potatoes are the major row crops in the survey area, although grain sorghum can be grown. Wheat, oats, and barley are common close-growing crops. Special commercial crops produced in the survey area are peas, beans, cabbage, broccoli, sweet corn, strawberries, and nursery plants. Soils that are deep, have good natural drainage, and warm up early in spring are best suited for the special crops such as fruits and vegetables. Good air drainage is needed to reduce frost damage. Pope, Philo, Cookport, and Wharton soils have the best soil properties for growing the tree fruits.

The latest information and suggestions for controlling erosion, designing drainage systems, adding lime and fertilizer to the soil, or using the soil for row crops or special crops can be obtained from the local office of the Cooperative Extension Service or the Soil Conservation Service.

yields per acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 5. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors.

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents. Available yield data from nearby counties and results of field trials and demonstrations are also considered.

The management needed to obtain the indicated yields of the various crops depends on the kind of soil and the crop. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residue, barnyard manure, and green-manure crops; and harvesting that insures the smallest possible loss.

For yields of irrigated crops, it is assumed that the irrigation system is adapted to the soils and to the crops grown, that good quality irrigation water is uniformly applied as needed, and that tillage is kept to a minimum.

The estimated yields reflect the productive capacity of each soil for each of the principal crops. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in table 5 are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Soil Conservation Service or of the Cooperative Extension Service can provide information about the management and productivity of the soils.

capability classes and subclasses

Capability classes and subclasses show, in a general way, the suitability of soils for most kinds of field crops. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used, for crops, and the way they respond to management. The grouping does not take into account major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor does it consider possible but unlikely major reclamation projects.

Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for woodland and for engineering purposes.

In the capability system, soils are generally grouped at two levels: capability class and subclass (*6*). These levels are defined in the following paragraphs.

Capability classes, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class I soils have slight limitations that restrict their use.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.

Class V soils are not likely to erode but have other limitations, impractical to remove, that limit their use.

Class VI soils have severe limitations that make them generally unsuitable for cultivation.

Class VII soils have very severe limitations that make them unsuitable for cultivation.

Class VIII soils and miscellaneous areas have limitations that nearly preclude their use for commercial crop production.

Capability subclasses are soil groups within one class. They are designated by adding a small letter, *e, w, s,* or *c,* to the class numeral, for example, IIe. The letter *e* shows that the main limitation is risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry.

In class I there are no subclasses because the soils of this class have few limitations. Class V contains only the subclasses indicated by *w, s,* or *c* because the soils in class V are subject to little or no erosion. They have other limitations that restrict their use to pasture, woodland, wildlife habitat, or recreation.

Capability units are soil groups within a subclass. The soils in a capability unit are enough alike to be suited to the same crops and pasture plants, to require similar management, and to have similar productivity. Capability units are generally designated by adding an Arabic numeral to the subclass symbol, for example, IIe-4 or IIIe-6.

The acreage of soils in each capability class and subclass is shown in table 6. The capability classification of each map unit is given in the section "Detailed soil map units."

woodland management and productivity

Paxton G. Wolfe, woodland conservationist, Soil Conservation Service, assisted in preparing this section.

Cambria County has approximately 283,600 acres of woodland (*9*), 16 percent of which is publicly owned. Most of the woodland is stands of second- and third-growth trees.

The principal types of forest cover and their extent (*5*) are oak-hickory, 56 percent; maple-beech-birch, 22 percent; elm-ash-red maple, 9 percent; aspen-birch, 5 percent; chestnut oak, 5 percent; white pine, 2 percent; and Virginia pine-pitch pine, 1 percent.

An oak-hickory cover mainly consists of white oak, red oak, and hickories, although black oak and chestnut oak are dominant in some areas. The principal associates are yellow-poplar, shagbark hickory, white ash, red maple, and beech.

Sugar maple, beech, and yellow birch are the main species of the maple-beech-birch cover type. The associated species are varying admixtures of basswood, red maple, hemlock, red oak, white ash, white pine, black birch, black cherry, yellow-poplar, and cucumbertree.

Elm-ash-red maple is mainly white ash, American elm, and red maple. The major associates are slippery elm, yellow birch, sycamore, and hemlock.

The aspen-birch cover consists of quaking aspen, bigtooth aspen, and gray birch. The principal associates are pin cherry, red maple, yellow birch, white pine, ash, and sugar maple.

The chestnut oak cover type grows in pure stands or is dominant. The common associates are red oak, white oak, black oak, scarlet oak, pitch pine, blackgum, and red maple.

White pine cover is pure or predominant. The principal associates are Virginia pine and pitch pine, ash, sugar maple and red maple, hemlock, red oak and white oak, quaking aspen and bigtooth aspen, and paper birch, yellow birch, and black birch.

Virginia pine-pitch pine cover type consists of Virginia pine and pitch pine mixed with red oak, black oak, scarlet oak, chestnut oak, and hickories.

Sawtimber makes up about 56 percent of the acreage in commercial woodland, poletimber 26 percent, seedlings and saplings 16 percent, and nonstocked or sparsely stocked 2 percent.

Table 7 can be used by woodland owners or forest managers in planning the use of soils for wood crops. Only those soils suitable for wood crops are listed. The table lists the ordination (woodland suitability) symbol for each soil. Soils assigned the same ordination symbol

require the same general management and have about the same potential productivity.

The first part of the *ordination symbol*, a number, indicates the potential productivity of the soils for important trees. The number 1 indicates very high productivity; 2, high; 3, moderately high; 4, moderate; and 5, low. The second part of the symbol, a letter, indicates the major kind of soil limitation. The letter *x* indicates stoniness or rockiness; *w*, excessive water in or on the soil; *d*, restricted root depth; *f*, high content of stone fragments in the soil profile; and *r*, steep slopes. The letter *o* indicates that limitations or restrictions are insignificant. If a soil has more than one limitation, the priority is as follows: x, w, d, f, and r.

In table 7, *slight, moderate,* and *severe* indicate the degree of the major soil limitations to be considered in management.

Ratings of the *erosion hazard* indicate the risk of loss of soil in well managed woodland. The risk is *slight* if the expected soil loss is small, *moderate* if measures are needed to control erosion during logging and road construction, and *severe* if intensive management or special equipment and methods are needed to prevent excessive loss of soil.

Ratings of *equipment limitation* reflect the characteristics and conditions of the soil that restrict use of the equipment generally needed in woodland management or harvesting. A rating of *slight* indicates that use of equipment is not limited to a particular kind of equipment or time of year; *moderate* indicates a short seasonal limitation or a need for some modification in management or in equipment; and *severe* indicates a seasonal limitation, a need for special equipment or management, or a hazard in the use of equipment.

Seedling mortality ratings indicate the degree to which the soil affects the mortality of tree seedlings. Plant competition is not considered in the ratings. The ratings apply to seedlings from good stock that are properly planted during a period of sufficient rainfall. A rating of *slight* indicates that the expected mortality is less than 25 percent; *moderate*, 25 to 50 percent; and *severe*, more than 50 percent.

Ratings of *windthrow hazard* are based on the soil characteristics that affect the development of tree roots and the ability of the soil to hold trees firmly. A rating of *slight* indicates that a few trees may be blown down by normal winds; *moderate*, that some trees will be blown down during periods of excessive soil wetness and strong winds; and *severe*, that many trees are blown down during periods of excessive soil wetness and moderate or strong winds.

The *potential productivity* of merchantable or *common trees* on a soil is expressed as a *site index*. This index is the average height, in feet, that dominant and codominant trees of a given species attain in 50 years. The site index applies to fully stocked, even-aged, unmanaged stands. Site index is listed for trees that woodland managers generally favor for wood crop production. Such species are the most important in regard to growth rate, quality, value, and marketability. Other tree species that are commonly on the soil are also listed, regardless of value and growth potential.

Trees to plant are those that are suited to the soils and to commercial wood production.

engineering

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. The ratings are given in the following tables: Building site development, Sanitary facilities, Construction materials, and Water management. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil properties" section.

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations need to be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 to 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kind of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to (1) evaluate the potential of areas for residential, commercial, industrial, and recreation uses; (2) make preliminary estimates of construction conditions; (3) evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; (4) evaluate alternative sites for sanitary landfills,

septic tank absorption fields, and sewage lagoons; (5) plan detailed onsite investigations of soils and geology; (6) locate potential sources of gravel, sand, earthfill, and topsoil; (7) plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and (8) predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the Glossary.

building site development

Table 8 shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to bedrock, a cemented pan, or a very firm dense layer; stone content; soil texture; and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and the depth to the water table.

Dwellings and small commercial buildings are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for small commercial buildings without basements, for dwellings with basements, and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, shrink-swell potential, and organic layers can cause the movement of footings. A high water table, depth to bedrock or to a cemented pan, large stones, and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 to 6 feet are not considered.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material, a base of gravel, crushed rock, or stabilized soil material, and a flexible or rigid surface. Cuts and fills are generally limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. Depth to bedrock or to a cemented pan, a high water table, flooding, large stones, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), shrink-swell potential, frost action potential, and depth to a high water table affect the traffic supporting capacity.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. The ratings are based on soil properties, site features, and observed performance of the soils. Soil reaction, a high water table, depth to bedrock or to a cemented pan, the available water capacity in the upper 40 inches, and the content of salts, sodium, and sulfidic materials affect plant growth. Flooding, wetness, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer affect trafficability after vegetation is established.

sanitary facilities

Table 9 shows the degree and the kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

Table 9 also shows the suitability of the soils for use as daily cover for landfills. A rating of *good* indicates that soil properties and site features are favorable for the use and good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil

through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 72 inches is evaluated. The ratings are based on soil properties, site features, and observed performance of the soils. Permeability, a high water table, depth to bedrock or to a cemented pan, and flooding affect absorption of the effluent. Large stones and bedrock or a cemented pan interfere with installation.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand and gravel or fractured bedrock is less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. There must be unsaturated soil material beneath the absorption field to effectively filter the effluent. Many local ordinances require that this material be of a certain thickness.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Lagoons generally are designed to hold the sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water.

Table 9 gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, a high water table, depth to bedrock or to a cemented pan, flooding, large stones, and content of organic matter.

Excessive seepage due to rapid permeability of the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope, bedrock, and cemented pans can cause construction problems, and large stones can hinder compaction of the lagoon floor.

Sanitary landfills are areas where solid waste is disposed of by burying it in soil. There are two types of landfill—trench and area. In a trench landfill, the waste is placed in a trench. It is spread, compacted, and covered daily with a thin layer of soil excavated at the site. In an area landfill, the waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site.

Both types of landfill must be able to bear heavy vehicular traffic. Both types involve a risk of ground water pollution. Ease of excavation and revegetation needs to be considered.

The ratings in table 9 are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock or to a cemented pan, a high water table, slope, and flooding affect both types of landfill. Texture, stones and boulders, highly organic layers, soil reaction, and content of salts and sodium affect trench type landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area type sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste.

Soil texture, wetness, coarse fragments, and slope affect the ease of removing and spreading the material during wet and dry periods. Loamy or silty soils that are free of large stones or excess gravel are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult to spread; sandy soils are subject to soil blowing.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over bedrock, a cemented pan, or the water table to permit revegetation. The soil material used as final cover for a landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

construction materials

Table 10 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good, fair,* or *poor* as a source of roadfill and topsoil. They are rated as a probable or improbable source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be mixed during excavating and spreading. Many soils have layers of contrasting suitability within their profile. The table showing engineering index

properties provides detailed information about each soil layer. This information can help determine the suitability of each layer for use as roadfill. The performance of soil after it is stabilized with lime or cement is not considered in the ratings.

The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of suitable material is a major consideration. The ease of excavation is affected by large stones, a high water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the engineering classification of the soil) and shrink-swell potential.

Soils rated *good* contain significant amounts of sand or gravel or both. They have at least 5 feet of suitable material, low shrink-swell potential, few cobbles and stones, and slopes of 15 percent or less. Depth to the water table is more than 3 feet. Soils rated *fair* are more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have moderate shrink-swell potential, slopes of 15 to 25 percent, or many stones. Depth to the water table is 1 to 3 feet. Soils rated *poor* have a plasticity index of more than 10, a high shrink-swell potential, many stones, or slopes of more than 25 percent. They are wet, and the depth to the water table is less than 1 foot. They may have layers of suitable material, but the material is less than 3 feet thick.

Sand and gravel are natural aggregates suitable for commercial use with a minimum of processing. Sand and gravel are used in many kinds of construction. Specifications for each use vary widely. In table 10, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the engineering classification of the soil), the thickness of suitable material, and the content of rock fragments. Kinds of rock, acidity, and stratification are given in the soil series descriptions. Gradation of grain sizes is given in the table on engineering index properties.

A soil rated as a probable source has a layer of clean sand or gravel or a layer of sand or gravel that is up to 12 percent silty fines. This material must be at least 3 feet thick and less than 50 percent, by weight, large stones. All other soils are rated as an improbable source. Coarse fragments of soft bedrock, such as shale and siltstone, are not considered to be sand and gravel.

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area.

Plant growth is affected by toxic material and by such properties as soil reaction, available water capacity, and fertility. The ease of excavating, loading, and spreading is affected by rock fragments, slope, a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, a water table, rock fragments, bedrock, and toxic material.

Soils rated *good* have friable loamy material to a depth of at least 40 inches. They are free of stones and cobbles, have little or no gravel, and have slopes of less than 8 percent. They are low in content of soluble salts, are naturally fertile or respond well to fertilizer, and are not so wet that excavation is difficult.

Soils rated *fair* are sandy soils, loamy soils that have a relatively high content of clay, soils that have only 20 to 40 inches of suitable material, soils that have an appreciable amount of gravel, stones, or soluble salts, or soils that have slopes of 8 to 15 percent. The soils are not so wet that excavation is difficult.

Soils rated *poor* are very sandy or clayey, have less than 20 inches of suitable material, have a large amount of gravel, stones, or soluble salts, have slopes of more than 15 percent, or have a seasonal water table at or near the surface.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and nutrients for plant growth.

water management

Table 11 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas; embankments, dikes, and levees; and aquifer-fed ponds. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

This table also gives for each soil the restrictive features that affect drainage, irrigation, terraces and diversions, and grassed waterways.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability of the soil and the depth to fractured bedrock or other permeable material. Excessive slope can affect the storage capacity of the reservoir area.

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against

overflow. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth even greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of stones or boulders, organic matter, or salts or sodium. A high water table affects the amount of usable material. It also affects trafficability.

Aquifer-fed excavated ponds are pits or dugouts that extend to a ground-water aquifer or to a depth below a permanent water table. Excluded are ponds that are fed only by surface runoff and embankment ponds that impound water 3 feet or more above the original surface. Excavated ponds are affected by depth to a permanent water table, permeability of the aquifer, and quality of the water as inferred from the salinity of the soil. Depth to bedrock and the content of large stones affect the ease of excavation.

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to bedrock, to a cemented pan, or to other layers that affect the rate of water movement; permeability; depth to a high water table or depth of standing water if the soil is subject to ponding; slope; susceptibility to flooding; subsidence of organic layers; and potential frost action. Excavating and grading and the stability of ditchbanks are affected by depth to bedrock or to a cemented pan, large stones, slope, and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity or by toxic substances in the root zone, such as salts, sodium, or sulfur. Availability of drainage outlets is not considered in the ratings.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to reduce erosion and conserve moisture by intercepting runoff. Slope, wetness, large stones, and depth to bedrock or to a cemented pan affect the construction of terraces and diversions. A restricted rooting depth, a severe hazard of wind or water erosion, an excessively coarse texture, and restricted permeability adversely affect maintenance.

Grassed waterways are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Large stones, wetness, slope, and depth to bedrock or to a cemented pan affect the construction of grassed waterways. A hazard of wind erosion, low available water capacity, restricted rooting depth, toxic substances such as salts or sodium, and restricted permeability adversely affect the growth and maintenance of the grass after construction.

recreation

The opportunities for recreation in the county include hunting, fishing, hiking, swimming, skiing, golf, and camping. The major recreational facility is Glendale Lake, a part of Prince Gallitzin State Park. This complex has 1,640 acres of water, 28 miles of shore line, and a 6,640-acre park with 437 campsites.

Five State game lands in the county comprise more than 26,000 acres for hunting, and 18 streams and seven reservoirs offer fishing for trout, bass, and other species.

Most of the soils in the county have potential for some type of recreational development. The deep, well drained Hazleton, Laidig, Leck Kill, and Rayne soils with slopes of as much as 15 percent have the best potential for most recreational uses. The very stony Blairton, Hazleton, Gilpin, and Leetonia soils are limited for most intensive recreational uses, but have some potential for hiking trails, hunting, and other types of recreation requiring little or no land alteration.

The soils of the survey area are rated in table 12 according to limitations that affect their suitability for recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewerlines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation are also important. Soils subject to flooding are limited for recreation use by the duration and intensity of flooding and the season when flooding occurs. In planning recreation facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

In table 12, the degree of soil limitation is expressed as slight, moderate, or severe. *Slight* means that soil properties are generally favorable and that limitations are minor and easily overcome. *Moderate* means that limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.

The information in table 12 can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table 9

and interpretations for dwellings without basements and for local roads and streets in table 8.

Camp areas require site preparation such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils have mild slopes and are not wet or subject to flooding during the period of use. The surface has few or no stones or boulders, absorbs rainfall readily but remains firm, and is not dusty when dry. Strong slopes and stones or boulders can greatly increase the cost of constructing campsites.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The best soils for picnic areas are firm when wet, are not dusty when dry, are not subject to flooding during the period of use, and do not have slopes or stones or boulders that increase the cost of shaping sites or of building access roads and parking areas.

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is free of stones and boulders, is firm after rains, and is not dusty when dry. If grading is needed, the depth of the soil over bedrock or a hardpan should be considered.

Paths and trails for hiking, horseback riding, and bicycling should require little or no cutting and filling. The best soils are not wet, are firm after rains, are not dusty when dry, and are not subject to flooding more than once a year during the period of use. They have moderate slopes and few or no stones or boulders on the surface.

Golf fairways are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required. The best soils for use as golf fairways are firm when wet, are not dusty when dry, and are not subject to prolonged flooding during the period of use. They have moderate slopes and no stones or boulders on the surface. The suitability of the soil for tees or greens is not considered in rating the soils.

wildlife habitat

Clayton L. Heiney, wildlife biologist, Soil Conservation Service, assisted in preparing this section.

The principal types of game in the county are white-tailed deer, black bear, gray squirrel, cottontail rabbit, ruffed grouse, ring-necked pheasant, woodcock, and various species of waterfowl. The major furbearers are beaver, muskrat, raccoon, fox, and mink. The county also has a large variety of nongame wildlife, including songbirds, reptiles, amphibians, and small mammals. Land-use patterns in Cambria County, rather than types of soil or vegetation, have had the greatest effect on the population and distribution of the wildlife species in the county, especially for species such as black bear and turkey.

White-tailed deer inhabit areas throughout the county. They are considered forest species, but they neither prefer nor do well in large, mature forests. Rather, they prefer a combination of brush or young trees, sparse amounts of mature trees, and small open areas.

Ruffed grouse prefer young, brushy stands of trees, especially aspen, and open areas much like those that white-tailed deer inhabit. Squirrels are especially common in areas with mature, nut-producing woodlands. Cottontail rabbits are mostly in areas used for farming or areas of abandoned farmland, especially those with a brushy cover.

Black bears prefer forests common to the Cookport-Hazleton-Laidig and Gilpin-Ernest-Wharton general soil map associations, which have mixed stands of conifers and hardwoods of various ages. The black bear prefers areas with ample water and mainly inhabits the remote, rugged upland forests in the county.

The western part of Cambria has mature forests of spruce, hemlock, beech, and oak, making it one of the most suitable areas in the state for turkey. Mourning doves are common in the Gilpin-Ernest-Wharton, Brinkerton-Wharton-Cavode, and Cookport-Hazleton-Laidig general soil map associations. Doves thrive in areas where corn and small grains are grown, and although some nest in pine plantations, most prefer to nest and roost in trees adjacent to open land.

Muskrat, mink, and beaver live along the rivers, lakes, and ponds in the county. Muskrats and mink inhabit areas throughout the county, but beavers generally live in the more remote areas.

The woodcock population in the county live along stream bottoms and areas with grassy or weedy openings and thickets of shrubs or small trees. The presence and abundance of woodcock depend a great deal on the types of soil. Earthworms are a major part of the woodcock's diet, and their supply is directly affected by soil texture, moisture, temperature, and organic matter content. Earthworm production is higher in soils with a texture of sandy loam and loam than in clayey or silty soils. Areas of soils that have the proper moisture content and suitable texture, and which support alders, aspen, hawthorn, and dogwoods, usually support populations of woodcock.

The southwest part of Cambria County, which mainly consists of the Gilpin-Ernest-Wharton and Cookport-Hazleton-Laidig general soil map associations is the most popular area of the county for ring-necked pheasant. The common species of waterfowl in the county inhabit the Glendale Lake area and other ponds, lakes, streams, and beaver dams.

In table 13, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas, and

other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat.

The potential of the soil is rated good, fair, poor, or very poor. A rating of *good* indicates that the element or kind of habitat is easily established, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected. A rating of *fair* indicates that the element or kind of habitat can be established, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of *poor* indicates that limitations are severe for the designated element or kind of habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of *very poor* indicates that restrictions for the element or kind of habitat are very severe and that unsatisfactory results can be expected. Creating, improving, or maintaining habitat is impractical or impossible.

The elements of wildlife habitat are described in the following paragraphs.

Grain and seed crops are domestic grains and seed-producing herbaceous plants. Soil properties and features that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of grain and seed crops are corn, wheat, oats, and barley.

Grasses and legumes are domestic perennial grasses and herbaceous legumes. Soil properties and features that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, flood hazard, and slope. Soil temperature and soil moisture are also considerations. Examples of grasses and legumes are fescue, lovegrass, bromegrass, clover, and alfalfa.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds. Soil properties and features that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of wild herbaceous plants are bluestem, goldenrod, beggarweed, wheatgrass, and grama.

Hardwood trees and woody understory produce nuts or other fruit, buds, catkins, twigs, bark, and foliage. Soil properties and features that affect the growth of hardwood trees and shrubs are depth of the root zone, the available water capacity, and wetness. Examples of these plants are oak, poplar, cherry, sweetgum, apple, hawthorn, dogwood, hickory, blackberry, and blueberry. Examples of fruit-producing shrubs that are suitable for planting on soils rated *good* are Russian-olive, autumn-olive, and crabapple.

Coniferous plants furnish browse, seeds, and cones. Soil properties and features that affect the growth of coniferous trees, shrubs, and ground cover are depth of the root zone, available water capacity, and wetness. Examples of coniferous plants are pine, spruce, fir, cedar, and juniper.

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Soil properties and features affecting wetland plants are texture of the surface layer, wetness, reaction, salinity, slope, and surface stoniness. Examples of wetland plants are smartweed, wild millet, wildrice, saltgrass, cordgrass, rushes, sedges, and reeds.

Shallow water areas have an average depth of less than 5 feet. Some are naturally wet areas. Others are created by dams, levees, or other water-control structures. Soil properties and features affecting shallow water areas are depth to bedrock, wetness, surface stoniness, slope, and permeability. Examples of shallow water areas are marshes, waterfowl feeding areas, and ponds.

The habitat for various kinds of wildlife in described in the following paragraphs.

Habitat for openland wildlife consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants.

Habitat for woodland wildlife consists of areas of deciduous plants or coniferous plants or both and associated grasses, legumes, and wild herbaceous plants.

Habitat for wetland wildlife consists of open, marshy or swampy shallow water areas.

soil properties

Data relating to soil properties are collected during the course of the soil survey. The data and the estimates of soil and water features, listed in tables, are explained on the following pages.

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help characterize key soils.

The estimates of soil properties shown in the tables include the range of grain-size distribution and Atterberg limits, the engineering classifications, and the physical and chemical properties of the major layers of each soil. Pertinent soil and water features also are given.

engineering index properties

Table 14 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each soil series under "Soil series and their morphology."

Texture is given in the standard terms used by the U.S. Department of Agriculture (*7*). These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If a soil contains particles coarser than sand, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the Glossary.

Classification of the soils is determined according to the Unified soil classification system (*2*) and the system adopted by the American Association of State Highway and Transportation Officials (*1*).

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as Pt. Soils exhibiting engineering properties of two groups can have a dual classification, for example, SP-SM.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest.

Rock fragments larger than 3 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an oven-dry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

The estimates of grain-size distribution, liquid limit, and plasticity index are rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterberg limits extend a marginal amount (1 or 2 percentage points) across classification boundaries, the classification in the marginal zone is omitted in the table.

physical and chemical properties

Table 15 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils. Test data on soils in Pennsylvania are available at the Soil Characterization Laboratory, Department of Agronomy, The Pennsylvania State University.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each major soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The amount and kind of clay greatly affect the fertility and physical condition of the soil. They determine the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, permeability, and plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earth-moving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at 1/3 bar moisture tension. Weight is determined after drying the soil at 105 degrees C. In this table, the estimated moist bulk density of each major soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. A bulk density of more than 1.6 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Permeability refers to the ability of a soil to transmit water or air. The estimates indicate the rate of downward movement of water when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems, septic tank absorption fields, and construction where the rate of water movement under saturated conditions affects behavior.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each major soil layer. The capacity varies, depending on soil properties that affect the retention of water and the depth of the root zone. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Soil reaction is a measure of acidity or alkalinity and is expressed as a range in pH values. The range in pH of each major horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Shrink-swell potential is the potential for volume change in a soil with a loss or gain in moisture. Volume change occurs mainly because of the interaction of clay minerals with water and varies with the amount and type of clay minerals in the soil. The size of the load on the soil and the magnitude of the change in soil moisture content influence the amount of swelling of soils in place. Laboratory measurements of swelling of undisturbed clods were made for many soils. For others, swelling was estimated on the basis of the kind and amount of clay minerals in the soil and on measurements of similar soils.

If the shrink-swell potential is rated moderate to very high, shrinking and swelling can cause damage to buildings, roads, and other structures. Special design is often needed.

Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The change is based on the soil fraction less than 2 millimeters in diameter. The classes are *low*, a change of less than 3 percent; *moderate*, 3 to 6 percent; and *high*, more than 6 percent. *Very high*, greater than 9 percent, is sometimes used.

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter (up to 4 percent) and on soil structure and permeability. Values of K range from 0.05 to 0.69. The higher the value the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Organic matter is the plant and animal residue in the soil at various stages of decomposition.

In table 15, the estimated content of organic matter of the plow layer is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter of a soil can be maintained or increased by returning crop residue to the soil. Organic matter affects the available water capacity, infiltration rate, and tilth. It is a source of nitrogen and other nutrients for crops.

soil and water features

Table 16 gives estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils not protected by vegetation are assigned to one of four groups. They are grouped according to the intake of water when the soils are thoroughly wet and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

Flooding, the temporary inundation of an area, is caused by overflowing streams, by runoff from adjacent slopes, or by tides. Water standing for short periods after rainfall or snowmelt and water in swamps and marshes are not considered flooding.

Table 16 gives the frequency and duration of flooding and the time of year when flooding is most likely.

Frequency, duration, and probable dates of occurrence are estimated. Frequency is expressed as none, rare, common, occasional, and frequent. *None* means that flooding is not probable; *rare* that it is unlikely but possible under unusual weather conditions; *common* that it is likely under normal conditions; *occasional* that it occurs on an average of once or less in 2 years; and *frequent* that it occurs on an average of more than once in 2 years. Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, and *long* if more than 7 days. Probable dates are expressed in months; November-May, for example, means that flooding can occur during the period November through May.

The information is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and absence of distinctive horizons that form in soils that are not subject to flooding.

Also considered are local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The depth to a seasonal high water table applies to undrained soils. The estimates are based mainly on the evidence of a saturated zone, namely grayish colors or mottles in the soil. Indicated in table 16 are the depth to the seasonal high water table; the kind of water table—that is, perched, artesian, or apparent; and the months of the year that the water table commonly is high. A water table that is seasonally high for less than 1 month is not indicated in table 16.

An apparent water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil. An artesian water table is under hydrostatic head, generally beneath an impermeable layer. When this layer is penetrated, the water level rises in an uncased borehole. A perched water table is water standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

Only saturated zones within a depth of about 6 feet are indicated. A plus sign preceding the range in depth indicates that the water table is above the surface of the soil. The first numeral in the range indicates how high the water rises above the surface. The second numeral indicates the depth below the surface.

Depth to bedrock is given if bedrock is within a depth of 5 feet. The depth is based on many soil borings and on observations during soil mapping. The rock is specified as either soft or hard. If the rock is soft or fractured, excavations can be made with trenching machines, backhoes, or small rippers. If the rock is hard or massive, blasting or special equipment generally is needed for excavations.

Potential frost action is the likelihood of upward or lateral expansion of the soil caused by the formation of

segregated ice lenses (frost heave) and the subsequent collapse of the soil and loss of strength on thawing. Frost action occurs when moisture moves into the freezing zone of the soil. Temperature, texture, density, permeability, content of organic matter, and depth to the water table are the most important factors considered in evaluating the potential for frost action. It is assumed that the soil is not insulated by vegetation or snow and is not artificially drained. Silty and highly structured clayey soils that have a high water table in winter are most susceptible to frost action. Well drained, very gravelly, or very sandy soils are the least susceptible. Frost heave and low soil strength during thawing cause damage mainly to pavements and other rigid structures.

Risk of corrosion pertains to potential soil-induced chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to soil moisture, particle-size distribution, total acidity, and electrical conductivity of the soil material. The rate of corrosion of concrete is based mainly on the sulfate content, texture, and acidity of the soil. Protective measures for steel or more resistant concrete help to avoid or minimize damage resulting from the corrosion. Uncoated steel intersecting soil boundaries or soil layers is more susceptible to corrosion than an installation that is entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low*, *moderate*, or *high*, is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion is also expressed as *low*, *moderate*, or *high*. It is based on soil texture, acidity, and amount of sulfates in the saturation extract.

classification of the soils

The system of soil classification used by the National Cooperative Soil Survey has six categories (*8*). Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. In table 17, the soils of the survey area are classified according to the system. The categories are defined in the following paragraphs.

ORDER. Ten soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Entisol.

SUBORDER. Each order is divided into suborders primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Aquent (*Aqu*, meaning water, plus *ent*, from Entisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Fluvaquents (*Fluv*, meaning water deposited, plus *aquent*, the suborder of the Entisols that have an aquic moisture regime).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that typifies the great group. An example is Typic Fluvaquents.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Mostly the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineral content, temperature regime, depth of the root zone, consistence, moisture equivalent, slope, and permanent cracks. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is fine-loamy, mixed, nonacid, mesic Typic Fluvaquents.

SERIES. The series consists of soils that have similar horizons in their profile. The horizons are similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. The texture of the surface layer or of the substratum can differ within a series.

soil series and their morphology

In this section, each soil series recognized in the survey area is described. The descriptions are arranged in alphabetic order.

Characteristics of the soil and the material in which it formed are identified for each series. The soil is compared with similar soils and with nearby soils of other series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the Soil Survey Manual (*7*). Many of the technical terms used in the descriptions are defined in Soil Taxonomy (*8*). Unless otherwise stated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

The map units of each soil series are described in the section "Detailed soil map units."

Albrights series

Soils of the Albrights series are fine-loamy, mixed, mesic Aquic Fragiudalfs. The soils are deep, moderately well drained and somewhat poorly drained, and moderately slowly permeable and are on uplands. They formed in colluvium derived from red shale, siltstone, and fine-grained sandstone. Slopes range from 3 to 15 percent.

Albrights soils are associated on the landscape with moderately well drained Cookport soils and well drained Hazleton and Laidig soils. Albrights soils have a thicker solum and higher base saturation than Cookport soils.

Typical pedon of Albrights silt loam, 8 to 15 percent slopes, in a wooded area, Jackson Township, on U.S. Route 22, 1 mile west of Route 11020, 1,155 feet south of U.S. Route 22 on camp access road, at intersection of stream and access road, on west side of road:

A1—0 to 3 inches; dark brown (7.5YR 3/2) silt loam; moderate fine granular structure; friable; 10 percent coarse fragments; strongly acid; abrupt smooth boundary.

B1—3 to 12 inches; reddish brown (5YR 4/3) channery silt loam; weak medium subangular blocky structure; friable; slightly sticky, slightly plastic; very thin patchy clay films on ped faces; 20 percent coarse fragments; strongly acid; clear wavy boundary.

B2t—12 to 31 inches; reddish brown (5YR 4/3) channery silty clay loam; few fine faint reddish gray (5YR 5/2) mottles below a depth of 16 inches; moderate medium angular blocky structure; firm, sticky, plastic; thin continuous clay films on ped faces; 25 percent coarse fragments; strongly acid; gradual wavy boundary.

Bx1—31 to 41 inches; reddish brown (5YR 4/3) channery loam; common medium distinct reddish gray (5YR 5/2) and strong brown (7.5YR 5/6) mottles; moderate very coarse prismatic structure parting to weak thick platy; very firm and brittle; slightly sticky, slightly plastic; thin clay films on ped faces and lining pores; 30 percent coarse fragments; strongly acid; clear wavy boundary.

Bx2—41 to 50 inches; reddish brown (5YR 4/3) channery loam; few medium prominent gray (5YR 5/1) mottles; moderate very coarse prismatic structure parting to weak thick platy; firm and brittle; slightly sticky, slightly plastic; thin clay films on ped faces; 35 percent coarse fragments; strongly acid; gradual wavy boundary.

C—50 to 80 inches; weak red (2.5YR 4/2) channery loam; common medium distinct reddish brown (5YR 4/4) mottles; massive; firm, slightly sticky and slightly plastic; 35 percent coarse fragments; strongly acid.

The solum is 40 to 65 inches thick or more. Bedrock is at a depth of 5 to 8 feet or more. The depth to the fragipan ranges from about 18 to 32 inches. Coarse fragments make up about 5 to 30 percent of the part of the solum above the Bx horizon and 10 to 50 percent of the Bx and C horizons. In unlimed areas reaction ranges from extremely acid to strongly acid in the upper part of the solum and from very strongly acid to slightly acid in the lower part of the solum and in the C horizon. Depth to low-chroma mottles ranges from 12 to 20 inches.

The A horizon has hue of 5YR to 7.5YR, value of 3 to 5, and chroma of 2 to 4. It is dominantly silt loam but is loam in some areas.

The B1 and B2 horizons have hue of 5YR or 2.5YR, value of 4 or 5, and chroma of 3 to 6. The texture in the fine earth ranges from silt loam to clay loam.

The Bx horizon has hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 2 to 6. The texture in the fine earth ranges from loam to silty clay loam.

The C horizon has hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 2 to 6. The texture in the fine earth ranges from loam to silty clay loam.

Armagh series

Soils of the Armagh series are clayey, mixed, mesic Typic Ochraquults. The soils are deep, poorly drained, and slowly permeable and are along streams and on broad ridgetops and benches on uplands. They formed in materials weathered from acid gray shale and some interbedded siltstone and sandstone. Slopes range from 0 to 8 percent.

Armagh soils are associated on the landscape with deep, somewhat poorly drained Cavode soils, moderately well drained Wharton soils, and poorly drained Brinkerton soils. Armagh soils do not have the fragipan of the Brinkerton soils.

Typical pedon of Armagh silt loam, 0 to 8 percent slopes, 1 mile east of U.S. 219, in Summerhill, along railroad tracks, 1,320 feet south of railroad tracks:

A1—0 to 2 inches; black (10YR 2/1) silt loam; moderate fine granular structure; friable; slightly sticky, slightly plastic; strongly acid; abrupt smooth boundary.

A2g—2 to 6 inches; dark gray (10YR 4/1) silt loam; few fine distinct light brownish gray (2.5Y 6/2) and light olive brown (2.5Y 5/6) mottles; moderate fine granular structure; friable; slightly sticky, slightly plastic; strongly acid; abrupt smooth boundary.

B21tg—6 to 18 inches; light brownish gray (10YR 6/2) silty clay loam; common medium distinct reddish yellow (7.5YR 6/8) and yellowish red (5YR 5/8) mottles; moderate coarse prismatic structure parting to weak medium subangular blocky; firm, slightly sticky, slightly plastic; strongly acid; clear wavy boundary.

B22tg—18 to 28 inches; gray (N 6/0) silty clay; common medium distinct strong brown (7.5YR 5/6) and yellowish red (5YR 5/8) mottles; moderate coarse prismatic structure parting to weak medium subangular blocky; firm, sticky, plastic; thick continuous clay films on ped faces; 5 percent coarse fragments; strongly acid; clear wavy boundary.

B23tg—28 to 36 inches; light gray (10YR 7/1) silty clay; common medium distinct strong brown (7.5YR 5/6) and yellowish red (5YR 5/8) mottles; moderate coarse prismatic structure parting to weak medium subangular blocky; firm, sticky, plastic; thick continuous clay films on ped faces; 10 percent

coarse fragments; strongly acid; gradual wavy boundary.
B3g—36 to 44 inches; light gray (10YR 7/1) silty clay; few medium distinct strong brown (7.5YR 5/6) and reddish yellow (7.5YR 6/8) mottles; moderate coarse prismatic structure parting to weak medium subangular blocky; firm, sticky, plastic; 10 percent coarse fragments; strongly acid; gradual wavy boundary.
Cg—44 to 60 inches; gray (10YR 5/1) shaly silty clay; common medium distinct strong brown (7.5YR 5/6) mottles; massive; firm, sticky, plastic; 30 percent coarse fragments; strongly acid.

The solum is 30 to 50 inches thick. Bedrock is at a depth of 3-1/2 to 6 feet. Coarse fragments make up 0 to 15 percent of the upper part of the solum, 5 to 25 of percent of lower part of the solum, and 10 to 80 percent of the C horizon. In unlimed areas reaction is strongly acid or very strongly acid throughout.

The A horizon has hue of 10YR and 2.5Y, value of 2 to 5, and chroma of 1 or 2. It is dominantly silt loam but is silty clay loam in some areas.

The B horizon has hue of 7.5YR and 10YR, value of 4 to 7, and chroma of 0 to 2. The texture in the fine earth is silty clay loam, silty clay, and clay.

The C horizon has hue of 7.5YR and 10YR, value of 3 to 5, and chroma of 1 to 6. The texture in the fine earth is silty clay, silty clay loam, clay loam, and loam.

Atkins series

Soils of the Atkins series are fine-loamy, mixed, acid, mesic Typic Fluvaquents. The soils are deep, poorly drained, and slowly permeable to moderately permeable and are on flood plains. They formed in recent alluvium derived from sandstone and shale. Slopes range from 0 to 3 percent.

Atkins soils are associated on the landscape with well drained Pope soils and moderately well drained Philo soils.

Typical pedon of Atkins silt loam, along the Little Conemaugh River, 0.75 mile west of U.S. 219 at Summerhill, along railroad tracks, 660 feet north of railroad tracks:

A1—0 to 4 inches; dark gray (10YR 4/1) silt loam; weak fine granular structure; friable; many fine grass roots; strongly acid; clear wavy boundary.
A2—4 to 12 inches; gray (10YR 5/1) silt loam; common medium distinct strong brown (7.5YR 5/6) mottles; weak medium platy structure; friable; many fine grass roots; strongly acid; clear wavy boundary.
B21g—12 to 16 inches; light brownish gray (10YR 6/2) silt loam; common medium distinct yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable; strongly acid; clear wavy boundary.
B22g—16 to 28 inches; gray (10YR 5/1) silty clay loam; common medium distinct strong brown (7.5YR 5/6) mottles; moderate fine angular blocky structure; firm, slightly sticky, plastic; strongly acid; clear wavy boundary.
B23g—28 to 38 inches; gray (5Y 6/1) silty clay loam; common medium distinct strong brown (7.5YR 5/8) mottles; moderate medium angular blocky structure; friable; slightly sticky, plastic; strongly acid; clear wavy boundary.
B24g—38 to 42 inches; dark grayish brown (10YR 5/2) silt loam; common medium distinct strong brown (7.5YR 5/6) and yellowish red (5YR 5/8) mottles; moderate fine angular blocky structure; firm, slightly sticky, plastic; strongly acid; clear wavy boundary.
Cg—42 to 60 inches; dark grayish brown (10YR 5/2) silt loam; common medium distinct strong brown (7.5YR 5/6) and yellowish red (5YR 5/8) mottles; massive; firm, slightly sticky, plastic; strongly acid.

The solum is 30 to 50 inches thick. The depth to bedrock is greater than 5 feet. Coarse fragments make up 0 to 20 percent of the solum and 0 to 30 percent of the C horizon. In unlimed areas reaction is strongly acid and very strongly acid throughout.

The A horizon has hue of 10YR, value of 4 to 7, and chroma of 1 or 2. It is dominantly silt loam but is fine sandy loam, loam, and silty clay loam in some areas.

The B horizon has hue of 10YR to 5Y, value of 4 to 7, and chroma of 0 to 2. In pedons with hue of 2.5Y or redder and value of 6 or 7, the chroma is 2 or less. If the value is 4 or 5, the chroma is 0 or 1. If the hue is 5Y, the chroma is 2 or less. The horizon ranges from heavy sandy loam to silty clay loam. Mottles have hue of 5YR to 2.5Y, value of 3 to 6, and chroma of 2 to 8. Some pedons with chroma of 0 or 1 do not have mottles.

The C horizon is mottled and has hue of 10YR to 5Y, value of 5 or 6, and chroma of 0 to 8. It is sandy loam, silt loam, and loam. Some pedons have a IIC horizon of stratified sand and gravel.

Berks series

Soils of the Berks series are loamy-skeletal, mixed, mesic Typic Dystrochrepts. The soils are moderately deep, well drained, and moderately permeable and moderately rapidly permeable. They are on uplands. They formed in residuum of acid shale and siltstone. Slopes range from 3 to 25 percent.

Berks soils are associated on the landscape with poorly drained Brinkerton soils; moderately well drained Ernest soils; moderately deep, well drained Gilpin soils; and shallow, well drained Weikert soils. Berks soils are loamy-skeletal, and Gilpin soils are fine-loamy.

Typical pedon of Berks channery silt loam, 8 to 15 percent slopes, in Summerhill Township, on Route

11026, 0.25 mile east of Route T592, 660 feet south of Route 11026:

Ap—0 to 8 inches; dark brown (10YR 3/3) channery silt loam; moderate fine granular structure; friable; 30 percent coarse fragments; strongly acid; abrupt smooth boundary.
B21—8 to l6 inches; yellowish brown (10YR 5/6) channery silt loam; moderate fine subangular blocky structure; friable; 40 percent coarse fragments; strongly acid; gradual wavy boundary.
B22—16 to 22 inches; yellowish brown (10YR 5/6) very channery silt loam; weak fine subangular blocky structure; friable; 60 percent coarse fragments; strongly acid; gradual irregular boundary.
B3—22 to 26 inches; strong brown (7.5YR 5/6) very channery silt loam; massive; friable; 60 percent coarse fragments; strongly acid; gradual irregular boundary.
C—26 to 30 inches; yellowish brown (10YR 5/6) very channery loam in pockets; loam coatings on channery fragments; massive; friable; 75 percent coarse fragments; medium acid; gradual irregular boundary.
R—30 inches; very dark grayish brown (2.5Y 3/2) fractured shale bedrock.

The solum is 18 to 36 inches thick. Bedrock is at a depth of 20 to 40 inches. Coarse fragments make up 10 to 50 percent of the Ap horizon, 25 to 75 percent of the B horizon, and 50 to 80 percent of the C horizon. The weighted average coarse-fragment content in the control section is more than 35 percent. In unlimed areas reaction is strongly acid or very strongly acid in the solum and very strongly acid to medium acid in the C horizon.

The A horizon has hue of 10YR, value of 3 to 5, and chroma of 2 to 4. The fine-earth texture is dominantly silt loam, but in some areas it is loam.

The B horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 6 to 8. The fine-earth texture is silt loam or loam.

The C horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 to 6. The fine-earth texture is loam.

Blairton series

Soils of the Blairton series are fine-loamy, mixed, mesic Aquic Hapludults. The soils are moderately deep, somewhat poorly drained and moderately well drained, and moderately slowly permeable. They are on uplands. They formed in material derived from acid gray shale and interbedded fine-grained sandstone. Slopes range from 3 to 15 percent.

Blairton soils are associated on the landscape with moderately deep, well drained Berks and Gilpin soils; deep, moderately well drained Ernest soils; and deep, poorly drained Brinkerton soils. Blairton soils are moderately deep and do not have the fragipan of the Ernest soils.

Typical pedon of Blairton silt loam, 8 to 15 percent slopes, on Route 11108, 6,600 feet north of the intersection of U.S. Route 422 and Route 11108, in Pindleton, east side of road:

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) silt loam; moderate fine granular structure; very friable; 10 percent coarse fragments; strongly acid; abrupt smooth boundary.
B21t—9 to 16 inches; yellowish brown (10YR 5/4) shaly silty clay loam; few fine faint yellowish red (5YR 5/6) mottles in the lower part; moderate fine angular blocky structure; friable, slightly sticky, plastic; thin clay films on ped faces; 15 percent coarse fragments; strongly acid; clear smooth boundary.
B22t—16 to 26 inches; yellowish brown (10YR 5/6) shaly silty clay loam; common medium distinct light gray (2.5Y 7/2) mottles; moderate medium angular blocky structure; firm, sticky, plastic; thin clay films on ped faces; 30 percent coarse fragments; strongly acid; abrupt wavy boundary.
B3—26 to 30 inches; strong brown (7.5YR 5/6) shaly silty clay loam; common medium distinct light gray (10YR 7/2) mottles; weak medium angular blocky structure; firm, slightly sticky, plastic; 30 percent coarse fragments; strongly acid; clear wavy boundary.
C1—30 to 33 inches; brown (7.5YR 5/2) shaly silt loam; common medium distinct gray (10YR 5/1) mottles; massive; firm; 35 percent coarse fragments; strongly acid; clear wavy boundary.
C2—33 to 38 inches; light yellowish brown (10YR 6/4) shaly silt loam; common medium distinct light gray (2.5Y 7/0) mottles; massive; firm; 35 percent coarse fragments; strongly acid; abrupt irregular boundary.
R—38 inches; very dark grayish brown (2.5Y 3/2) fractured shale bedrock.

The solum is 20 to 40 inches thick. The depth to bedrock ranges from 20 to 40 inches. Coarse fragments make up 0 to 30 percent of the Ap horizon, 5 to 50 percent of the Bt horizon, and 30 to 90 percent of the B3 and C horizons. The control section averages less than 35 percent coarse fragments. In unlimed areas reaction ranges from strongly acid to extremely acid throughout. The depth to mottles with chroma of 2 or less ranges from 12 to 30 inches.

The A horizon has hue of 10YR, 7.5YR, or 2.5Y; value of 3 and 4; and chroma of 2 to 4. It is dominantly silt loam but is loam in some areas.

The B horizon has hue of 10YR, 7.5YR, or 2.5Y; value of 5 and 6; and chroma of 2 to 8. The texture in the fine earth ranges from loam to silty clay loam.

The C horizon has hue of 7.5YR to 2.5Y, value of 5 and 6, and chroma of 2 to 8. The texture in the fine earth is loam to silty clay loam.

Brinkerton series

Soils of the Brinkerton series are fine-silty, mixed, mesic Typic Fragiaqualfs. The soils are deep, poorly drained, and slowly permeable and are on uplands. They formed in material derived from acid gray shale and siltstone. Slopes range from 0 to 8 percent.

Brinkerton soils are associated on the landscape with well drained, moderately deep Berks and Gilpin soils and deep, moderately well drained Ernest soils.

Typical pedon of Brinkerton silt loam, 0 to 8 percent slopes, in West Carroll Township, at intersection of U.S. Route 219 and Route T531, at Foxburg, 1/2 mile north on Route T531:

A1—0 to 3 inches; grayish brown (10YR 5/2) silt loam; weak fine granular structure; friable; slightly sticky, slightly plastic; 5 percent coarse fragments; strongly acid; abrupt smooth boundary.

B1g—3 to 7 inches; grayish brown (2.5Y 5/2) silt loam; moderate fine granular structure; friable; slightly sticky, slightly plastic; 5 percent coarse fragments; strongly acid; gradual wavy boundary.

B21tg—7 to 17 inches; light brownish gray (10YR 6/2) silty clay loam; common medium distinct yellowish brown (10YR 5/6) and pale brown (10YR 6/3) mottles; moderate fine angular blocky structure; friable, sticky, plastic; thin clay films on ped faces; 5 percent coarse fragments; strongly acid; clear wavy boundary.

B22tg—17 to 28 inches; gray (10YR 6/1) silty clay loam; many medium prominent yellowish red (5YR 4/8) mottles; strong medium and coarse angular blocky structure; firm, sticky, plastic; thin continuous clay films on ped faces; 5 percent coarse fragments; strongly acid; abrupt wavy boundary.

Bx1g—28 to 41 inches; gray (10YR 6/1) silty clay loam; many coarse prominent dark brown (10YR 3/3) and yellowish red (5YR 5/8) mottles; moderate very coarse prismatic structure parting to moderate very thick platy; firm, brittle, slightly sticky, slightly plastic; thin clay films on ped faces; 10 percent coarse fragments; medium acid; clear wavy boundary.

Bx2g—41 to 60 inches; brown (10YR 5/3) gravelly silt loam; common medium distinct brownish yellow (10YR 6/6) mottles; moderate very coarse prismatic structure parting to moderate medium platy; very firm, brittle, nonsticky, nonplastic; 20 percent coarse fragments; medium acid.

The solum is 40 to 60 inches thick. Bedrock is at a depth of 6 feet or more. The depth to the fragipan ranges from 15 to 30 inches. Coarse fragments make up 0 to 10 percent, by volume, of the part of the profile above the fragipan, 0 to 20 percent of the fragipan, and 10 to 90 percent of the C horizon. In unlimed areas reaction ranges from very strongly acid to medium acid in the solum and from strongly acid to slightly acid in the C horizon.

The A horizon has hue of 10YR or 2.5Y, value 3 to 5, and chroma of 0 to 2. It is dominantly silt loam but is silty clay loam in some areas.

The B1 and Bt horizons have hue of 10YR and 2.5Y, value of 4 to 6, and chroma of 1 or 2 and are mottled. They have a fine-earth texture of silt loam and silty clay loam.

The Bx horizon has hue of 10YR and 2.5Y or N, value of 5 or 6, and chroma of 0 to 2. The fine-earth texture is silt loam, loam, and silty clay loam.

Some pedons have a C horizon with hue of 10YR, 7.5YR, and 2.5Y; value of 4 to 6; and chroma of 0 to 3. The fine-earth texture is silt loam, silty clay loam, or loam.

Cavode series

Soils of the Cavode series are clayey, mixed, mesic Aeric Ochraquults. The soils are deep, somewhat poorly drained, and slowly permeable and are on uplands. They formed in material weathered from acid clay shale and some interbedded siltstone and sandstone. Slopes range from 0 to 15 percent.

Cavode soils are associated on the landscape with poorly drained Armagh and Brinkerton soils, moderately well drained Wharton soils, and well drained Gilpin soils.

Typical pedon of Cavode silt loam, 330 feet east of the intersection of Routes 11022 and 11019, to private road, 6,270 feet south on private road, on the east side:

Ap—0 to 6 inches; dark grayish brown (10YR 4/2) silt loam; moderate fine granular structure; friable; strongly acid; abrupt smooth boundary.

B21t—6 to 14 inches, yellowish brown (10YR 5/6) silty clay loam; few fine faint strong brown (7.5YR 5/6) and light gray (10YR 6/1) mottles; moderate fine subangular blocky structure; friable, slightly sticky, plastic; moderately thick clay films nearly continuous on ped faces; strongly acid; gradual smooth boundary.

B22t—14 to 26 inches; grayish brown (10YR 5/2) silty clay; common medium distinct light brownish gray (10YR 6/2) and brownish yellow (10YR 6/6) mottles; strong medium angular blocky structure; firm, sticky, plastic; moderately thick clay films nearly continuous on ped faces; strongly acid; clear wavy boundary.

B23gt—26 to 36 inches; light brownish gray (2.5Y 6/2) silty clay; common medium distinct gray (5YR 6/1) mottles; strong medium angular blocky structure; firm, sticky, plastic; strongly acid; clear wavy boundary.

B24t—36 to 42 inches; light brownish gray (10YR 6/2) silty clay; many coarse distinct yellowish brown (10YR 5/4) mottles; strong medium angular blocky structure; firm, sticky, plastic; thin clay films on ped faces and lining pores; strongly acid; clear wavy boundary.

B3gt—42 to 58 inches; grayish brown (2.5Y 5/2) shaly silty clay; many coarse distinct strong brown (7.5YR 5/6) mottles; moderate fine subangular blocky structure; thin patchy clay films on ped faces; firm, slightly sticky, slightly plastic; 15 percent coarse fragments; very strongly acid; clear wavy boundary.

C—58 to 62 inches; dark yellowish brown (10YR 4/4) shaly silty clay; few medium prominent gray (10YR 5/1) mottles; moderate medium platy structure; firm, slightly sticky, slightly plastic; 40 percent coarse fragments; strongly acid.

The solum is 30 to 60 inches thick. The depth to bedrock ranges from 3-1/2 to 6 feet. Coarse fragments make up 0 to 15 percent of the upper part of the solum and from 10 to 80 percent of the B3 and C horizons. In unlimed areas reaction throughout the soil is very strongly acid or strongly acid.

The Ap horizon has hue of 10YR, value of 3 or 4, and chroma of 2 to 4. It is dominantly silt loam but is silty clay loam in some areas.

The upper part of the B horizon is mottled and has hue of 10YR and 2.5Y, value of 4 or 5, and chroma of 4 to 6. The lower part of the B horizon is mottled and has hue of 10YR to 5Y, value of 5 or 6, and chroma of 1 or 2. The fine-earth texture of the B horizon is silty clay loam to clay. The upper 20 inches of the B horizon is more than 35 percent clay.

The C horizon is mottled and has hue of 10YR to 5Y, value of 4 to 6, and chroma of 1 to 4. The fine-earth texture is silty clay loam, silty clay, or clay.

Cookport series

Soils of the Cookport series are fine-loamy, mixed, mesic Aquic Fragiudults. The soils are deep, moderately well drained, and moderately slowly permeable and slowly permeable and are on uplands. They formed in material derived from interbedded sandstone, conglomerate, and siltstone. Slopes range from 0 to 25 percent.

Cookport soils are associated on the landscape with well drained Hazleton soils, well drained to excessively drained Leetonia soils, and poorly drained Nolo soils.

Typical pedon of Cookport channery loam, in an area of Cookport and Ernest soils, 0 to 3 percent slopes, in Dean Township, 1 mile north on Route 11039 from the intersection of Routes 36 and 11039, 1,320 feet north:

A11—0 to 3 inches; very dark brown (10YR 2/2) channery loam; weak fine granular structure; friable; 15 percent coarse fragments; strongly acid; abrupt smooth boundary.

A12—3 to 4 inches; dark brown (10YR 4/3) channery loam; weak fine subangular blocky structure; friable; 15 percent coarse fragments; strongly acid; clear smooth boundary.

B1—4 to 14 inches; yellowish brown (10YR 5/4) loam; weak medium subangular blocky structure; friable; 10 percent coarse fragments; strongly acid; gradual wavy boundary.

B21t—14 to 23 inches; yellowish brown (10YR 5/6) channery loam; weak medium subangular blocky structure; friable, slightly sticky, slightly plastic; clay lines pores and bridges sand grains; 15 percent coarse fragments; strongly acid; gradual wavy boundary.

B22t—23 to 26 inches; light olive brown (2.5Y 5/4) channery loam; common medium distinct light brownish gray (10YR 6/2) and yellowish red (5YR 5/8) mottles; moderate medium angular blocky structure; friable, slightly sticky, slightly plastic; patches of clay films on ped faces and lining pores; 15 percent coarse fragments; strongly acid; clear wavy boundary.

Bx—26 to 40 inches; light olive brown (2.5Y 5/4) channery loam; common medium distinct light brownish gray (10YR 6/2) and reddish yellow (5YR 5/8) mottles; moderate coarse prismatic structure parting to moderate medium platy; firm, brittle; slightly sticky, slightly plastic; 15 percent coarse fragments; strongly acid; clear wavy boundary.

C—40 to 60 inches; grayish brown (2.5Y 5/2) channery sandy loam; few coarse prominent gray (10YR 6/1) mottles and black (10YR 2/1) oxide stains; massive; firm; 20 percent coarse fragments; strongly acid.

The solum is 28 to 40 inches thick. The depth to bedrock is more than 40 inches. The depth to the fragipan ranges from 16 to 27 inches. The content of coarse fragments ranges from 0 to 30 percent throughout the solum. In unlimed areas reaction is strongly acid or very strongly acid throughout.

The A horizon has hue of 10YR or 2.5Y, value of 2 to 5, and chroma of 2 to 4. The fine-earth texture is dominantly loam but is silt loam and sandy loam in some areas.

The B2 and Bx horizons have hue of 10YR to 7.5YR and 2.5Y, value of 4 or 5, and chroma of 4 to 8. Low-chroma mottles are in the upper 10 inches of the Bt horizon. The fine-earth texture of the B horizon is loam, sandy loam, sandy clay loam, and light clay loam.

The C horizon is mottled and has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 2 or 4. The fine-earth texture ranges from sandy loam to loam.

Ernest series

Soils of the Ernest series are fine-loamy, mixed, mesic Aquic Fragiudults. The soils are deep, moderately well drained, and moderately slowly permeable and slowly permeable. They are on uplands. They formed in colluvial material derived from gray acid shale, siltstone, and some sandstone. Slopes range from 0 to 25 percent.

Ernest soils are associated on the landscape with well drained to excessively drained Leetonia soils; well drained Hazleton, Gilpin, and Rayne soils; and poorly drained Nolo and Brinkerton soils.

Typical pedon of Ernest silt loam in an area of Cookport and Ernest soils, 3 to 8 percent slopes, in Blacklick Township, 1 mile north of Pindleton on Route 11108, west side of road:

Ap—0 to 8 inches; dark yellowish brown (10YR 4/4) silt loam; moderate fine granular structure; friable; 5 percent coarse fragments; very strongly acid; abrupt smooth boundary.

B1—8 to 10 inches; yellowish brown (10YR 5/4) silt loam; moderate fine angular blocky structure; friable; 5 percent coarse fragments; strongly acid; clear smooth boundary.

B21t—10 to 16 inches; yellowish brown (10YR 5/6) silty clay loam; strong medium angular blocky structure; friable to firm, sticky, plastic; thin clay films on ped faces; 10 percent coarse fragments; strongly acid; clear wavy boundary.

B22t—16 to 26 inches; yellowish brown (10YR 5/6) silty clay loam; common medium distinct yellowish red (5YR 5/8) and light brownish gray (2.5Y 6/2) mottles; strong medium angular blocky structure; friable to firm, sticky, plastic; thin clay films on ped faces; 10 percent coarse fragments; strongly acid; clear wavy boundary.

Bx1—26 to 30 inches; brown (10YR 5/3) silty clay loam; many medium prominent reddish yellow (5YR 6/8) and strong brown (7.5YR 5/6) mottles; moderate coarse prismatic structure parting to weak thick platy; very firm, brittle, slightly sticky, slightly plastic; thin clay films on ped faces; 10 percent coarse fragments; strongly acid; abrupt wavy boundary.

Bx2—30 to 36 inches; brown (10YR 4/3) silty clay loam; common medium distinct light olive brown (2.5Y 5/4) and gray (10YR 5/1) mottles; few oxide streaks of dark brown (7.5YR 3/2); moderate coarse prismatic structure parting to weak thick platy; very firm, brittle, slightly sticky, slightly plastic; thin clay films on ped faces; 10 percent coarse fragments; strongly acid; abrupt wavy boundary.

Bx3—36 to 41 inches; olive brown (2.5Y 4/4) silty clay loam; many coarse distinct light gray (10YR 7/1), gray (10YR 5/1), and very dark gray (10YR 3/1) mottles; few black (2.5Y 2/0) oxide streaks; weak coarse prismatic structure parting to weak medium platy; very firm, brittle, slightly sticky, slightly plastic; 10 percent coarse fragments; very strongly acid; gradual wavy boundary.

C—41 to 61 inches; yellowish brown (10YR 5/4) silty clay loam; common medium distinct light gray (10YR 7/2) and light brownish gray (10YR 6/2) mottles; moderate medium platy structure; very firm; 10 percent coarse fragments; strongly acid.

The solum is 36 to 60 inches thick or more. The depth to bedrock is more than 5 feet. The depth to the fragipan ranges from 20 to 30 inches. Coarse fragments make up 5 to 20 percent of the profile above the Bx horizon and 5 to 30 percent of the Bx and C horizons. In unlimed areas reaction is strongly acid or very strongly acid throughout.

The A horizon has hue of 10YR or 7.5YR, value of 3 to 5, and chroma of 1 to 4. It is dominantly silt loam.

The B horizon has hue of 10YR and 7.5YR, value of 4 to 6, and chroma of 3 to 6. Low-chroma mottles are in the upper 10 inches of the Bt horizon. The fine-earth texture of the Bt horizon is silt loam or silty clay loam. The Bx horizon has hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 3 to 6. The fine-earth texture of the Bx horizon is loam to silty clay loam.

The C horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 2 to 6. The fine-earth texture ranges from silt loam to silty clay.

Gilpin series

Soils of the Gilpin series are fine-loamy, mixed, mesic Typic Hapludults. The soils are moderately deep, well drained, and moderately permeable and are on uplands. They are formed in material derived from interbedded gray and brown acid siltstone, shale, and sandstone. Slopes range from 3 to 70 percent.

Gilpin soils are associated on the landscape with somewhat poorly drained Cavode soils, moderately well drained Wharton and Ernest soils, well drained Rayne soils, and well drained Weikert soils.

Typical pedon of Gilpin silt loam, 3 to 8 percent slopes, in Carroll Township, 1/2 mile west on Route 553 from the intersection of Routes 219 and 553, north side of road:

Ap—0 to 10 inches; very dark grayish brown (10YR 3/2) silt loam; weak fine granular structure; friable; 10 percent coarse fragments; strongly acid; abrupt wavy boundary.

B21t—10 to 18 inches; yellowish brown (10YR 5/4) channery silty clay loam; moderate medium to fine angular blocky structure; friable, slightly sticky, slightly plastic; thin clay films on ped faces; 15 percent coarse fragments; strongly acid; clear irregular boundary.

B22t—18 to 28 inches; yellowish brown (10YR 5/4) channery silty clay loam; moderate fine angular

blocky structure; friable, slightly sticky, slightly plastic; thin clay films on ped faces; 15 percent coarse fragments; strongly acid; clear irregular boundary.

C—28 to 38 inches; light olive brown (2.5Y 5/4) very channery silt loam; weak thin platy structure; friable; 60 percent coarse fragments; strongly acid.

R—38 inches; light olive brown (2.5Y 5/4) fractured shale and siltstone bedrock.

The solum is 20 to 36 inches thick. Bedrock is at a depth of 20 to 40 inches (fig. 7). Coarse fragments make up 5 to 40 percent of the solum and 30 to 90 percent of the C horizon. In unlimed areas reaction ranges from strongly acid to extremely acid throughout.

The A horizon has hue of 10YR, value of 3 to 5, and chroma of 2 to 4. It is dominantly silt loam but is loam in some areas.

The B horizon has hue of 7.5YR to 2.5Y, value of 5, and chroma of 4 to 8. The fine-earth texture is silt loam, loam, and silty clay loam.

The C horizon has hue of 7.5YR to 2.5Y, value of 3 or 5, and chroma of 2 to 8. The fine-earth texture is silt loam and loam.

Figure 7.—Typical profile in an area of Gilpin silt loam, 3 to 8 percent slopes.

Hazleton series

Soils of the Hazleton series are loamy-skeletal, mixed, mesic Typic Dystrochrepts. The soils are deep, well drained, and moderately rapid to rapidly permeable and are on uplands. They formed in material derived from acid gray sandstone and conglomerate. Slopes range from 3 to 25 percent.

Hazleton soils are associated on the landscape with deep, well drained to excessively drained Leetonia soils; well drained Laidig soils; moderately deep Gilpin soils; and moderately well drained Cookport soils. Hazleton soils do not have the fragipan that is in the Laidig soils, and Hazleton soils do not have the spodic horizon in the Leetonia soils.

Typical pedon of Hazleton channery loam, 3 to 8 percent slopes, Susquehanna Township, 1-1/4 miles north of Branesboro on Route T565, 3/4 mile east of its intersection with Route 11087, south side of road:

A1—0 to 1 inch; black (10YR 2/1) channery loam; weak fine granular structure; friable; strongly acid; 40 percent coarse fragments; abrupt smooth boundary.

A2—1 to 2 inches; gray (10YR 5/1) channery loam; weak fine granular structure; very friable; 40 percent coarse fragments; strongly acid; abrupt smooth boundary.

B1—2 to 8 inches; brownish yellow (10YR 6/6) channery loam; weak medium subangular blocky structure; friable; 40 percent coarse fragments; strongly acid; clear smooth boundary.

B21—8 to 16 inches; yellowish brown (10YR 5/6) channery sandy loam; weak medium subangular blocky structure; friable; 40 percent coarse fragments; strongly acid; gradual wavy boundary.

B22—16 to 28 inches; yellowish brown (10YR 5/6) very channery sandy loam; weak medium subangular blocky structure; friable; 50 percent coarse fragments; strongly acid; gradual wavy boundary.

C1—28 to 36 inches; yellowish brown (10YR 5/6) very channery sandy loam; single grained; loose; silt films on coarse fragments; 50 percent coarse fragments; strongly acid; gradual wavy boundary.

C2—36 to 62 inches; yellowish brown (10YR 5/6) very channery sandy loam; massive; loose; 60 percent coarse fragments; strongly acid.

The solum is 25 to 50 inches thick. Bedrock is at a depth of 3-1/2 to 6 feet or more. The content of coarse fragments ranges from about 5 to 70 percent in the solum and from 35 to 80 percent in the C horizon but averages more than 35 percent in the control section. In unlimed areas reaction ranges from extremely acid to strongly acid throughout.

The A horizon has hue of 10YR, value of 2 to 5, and chroma of 1 to 4. The fine-earth texture is dominantly loam but is sandy loam in some areas.

The B horizon has hue of 10YR through 5YR, value of 3 to 6, and chroma of 3 to 8. The fine-earth texture is loam or sandy loam. The B3 horizon ranges from loam to loamy sand.

The C horizon has hue of 5YR to 2.5Y, value of 3 to 6, and chroma of 3 to 8. The fine-earth texture ranges from loam to loamy sand.

Laidig series

Soils of the Laidig series are fine-loamy, mixed, mesic Typic Fragiudults. The soils are deep, well drained, and moderately slowly permeable and are on uplands. They formed in colluvium derived from acid sandstone, siltstone, and shale. Slopes range from 3 to 45 percent.

Laidig soils are associated on the landscape with moderately well drained Cookport and Ernest soils, well drained to excessively drained Leetonia soils, and poorly drained Nolo soils. Laidig soils have a fragipan that is not in the Leetonia soils.

Typical pedon of Laidig loam, 3 to 8 percent slopes, in Belsano, on Route 271, 2,000 feet north of its intersection with Route 422, east side of road:

Ap—0 to 7 inches; very dark grayish brown (10YR 3/2) loam; weak fine granular structure; very friable; 10 percent coarse fragments; medium acid; abrupt smooth boundary.

B1—7 to 16 inches; yellowish brown (10YR 5/6) channery loam; weak fine subangular blocky structure; friable; 20 percent coarse fragments; very strongly acid; clear wavy boundary.

B21t—16 to 28 inches; strong brown (7.5YR 5/6) channery loam; moderate medium subangular blocky structure; friable; slightly sticky, slightly plastic; thin patchy clay films on ped faces; 20 percent coarse fragments; very strongly acid; gradual wavy boundary.

B22t—28 to 36 inches; strong brown (7.5YR 5/6) channery sandy clay loam; moderate medium subangular blocky structure; firm; slightly sticky, slightly plastic; continuous thin clay films on ped faces; 20 percent coarse fragments; very strongly acid; gradual wavy boundary.

Bx1—36 to 50 inches; brown (7.5YR 5/4) channery heavy sandy loam; common fine distinct brown (10YR 5/3) and yellowish red (5YR 5/6) mottles; moderate coarse prismatic structure parting to moderate medium subangular blocky; firm, brittle; 35 percent coarse fragments; strongly acid; gradual wavy boundary.

Bx2—50 to 65 inches; dark brown (7.5YR 4/4) channery heavy sandy loam; common fine distinct brown (10YR 5/3) and yellowish red (7.5YR 5/6) mottles; moderate coarse prismatic structure parting to moderate medium subangular blocky; firm; brittle; 40 percent coarse fragments; strongly acid; gradual wavy boundary.

The solum is 60 to 80 inches thick. Bedrock is at a depth of 6 feet or more. The depth to the fragipan ranges from 30 to 50 inches. Coarse fragments make up 10 to 35 percent of the solum above the Bx horizon and 30 to 70 percent of the Bx horizon. In unlimed areas reaction ranges from strongly acid to extremely acid throughout.

The A horizon has hue of 10YR or 7.5YR, value of 3 to 6, and chroma of 1 to 8. The fine-earth texture is dominantly loam but is sandy loam and silt loam in some areas.

The B1 and Bt horizons have hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 4 to 8. They have a fine-earth texture of loam, heavy sandy loam, silt loam, or sandy clay loam.

The Bx horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 to 6 and is mottled. The fine-earth texture is loam, heavy sandy loam, silt loam, or sandy clay loam.

Leck Kill series

Soils of the Leck Kill series are fine-loamy, mixed, mesic Typic Hapludults. The soils are deep, well drained, and moderately permeable to moderately rapidly permeable and are on uplands. They formed in material weathered from interbedded red shale, siltstone, and fine-grained sandstone. Slopes range from 3 to 25 percent.

Leck Kill soils are associated on the landscape with well drained Hazleton and Laidig soils, moderately well drained and somewhat poorly drained Albrights soils, and poorly drained Nolo soils. Leck Kill soils are fine-loamy, and Hazleton soils are loamy-skeletal. Leck Kill soils do not have the fragipan of the Laidig soils.

Typical pedon of Leck Kill silt loam, 15 to 25 percent slopes, 3 miles southeast of Martindale, on Route 11116, 1 mile south of its intersection with Route 164, 600 feet west of road, along powerline:

Ap—0 to 7 inches; dark reddish gray (5YR 4/2) silt loam; moderate fine granular structure; friable; slightly sticky, slightly plastic; 5 percent coarse fragments; strongly acid; abrupt smooth boundary.

B1—7 to 14 inches; reddish brown (5YR 4/4) shaly silt loam; moderate medium subangular blocky structure; firm; sticky, plastic; 15 percent coarse fragments; medium acid; gradual diffuse boundary.

B2t—14 to 24 inches; reddish brown (5YR 4/4) shaly silt loam; moderate medium subangular blocky structure; firm; sticky, plastic; thin clay films on ped faces; 20 percent coarse fragments; strongly acid; gradual diffuse boundary.

B3t—24 to 36 inches; reddish brown (5YR 4/4) shaly silt loam; moderate medium subangular blocky structure; firm; sticky, plastic; thin clay films on ped

faces; 35 percent coarse fragments; strongly acid; gradual diffuse boundary.
C—36 to 45 inches; reddish brown (5YR 4/4) very shaly silt loam; massive; firm; 60 percent coarse fragments; strongly acid; abrupt smooth boundary.
R—45 inches; reddish brown (5YR 4/3) shale bedrock.

The solum is 24 to 48 inches thick. Bedrock is at a depth of 3-1/2 to 6 feet. Coarse fragments make up 5 to 25 percent of the A and B1 horizons, 10 to 40 percent of individual horizons of the Bt horizon, 35 to 50 percent of the B3 horizon, and 60 to 90 percent of the C horizon. The coarse fragment content averages less than 35 percent in the upper 20 inches of the Bt horizon. In unlimed areas reaction ranges from neutral to very strongly acid in the solum and from very strongly acid to medium acid in the C horizon.

The A horizon has hue of 7.5YR to 2.5YR, value of 3 or 4, and chroma of 2 to 4. The fine-earth texture is dominantly silt loam but is loam in some areas.

The B horizon has hue of 5YR to 10R, value of 3 to 5, and chroma of 4 to 6. The fine-earth texture ranges from loam to silty clay loam.

The C horizon has hue of 5YR through 10R, value of 3 to 5, and chroma of 4 to 6. The fine-earth texture is silt loam, loam, or clay loam.

Leetonia series

Soils of the Leetonia series are sandy-skeletal, siliceous, mesic Entic Haplorthods. Leetonia soils in Cambria County are a taxadjunct because they contain more carbon in the Bh horizon, have a higher percentage of silt in the control section, and have a thicker solum than is defined in the range for the series. These differences, however, do not have a major effect on use or management. The Leetonia soils in this survey area are classified as loamy-skeletal, siliceous, mesic Typic Haplorthods. The soils are deep, well drained to excessively drained, and moderately rapidly permeable and are on uplands. They formed in highly siliceous material weathered mainly from sandstone, conglomerate, and quartzite. Slopes range from 3 to 8 percent.

Leetonia soils are associated on the landscape with moderately well drained Cookport soils, poorly drained Nolo soils, and well drained Laidig soils.

Typical pedon of Leetonia very flaggy loamy sand, 3 to 8 percent slopes, in a wooded area, in Blandburg, Reade Township, 2,000 feet south of the intersection of Route 865 and abandoned railroad tracks, 1-1/2 miles north of Route 865:

O1—2 inches to 1 inch; litter of loose leaves and twigs.
O2—1 inch to 0; partly decomposed litter.
A1—0 to 1 inch; black (10YR 2/1) flaggy loamy sand; weak fine granular structure; loose; nonsticky, nonplastic; 20 percent coarse fragments; very strongly acid; abrupt smooth boundary.
A2—1 to 11 inches; light brownish gray (10YR 6/2) very flaggy loamy sand; single grained; loose; nonsticky, nonplastic; 65 percent coarse fragments; very strongly acid; clear wavy boundary.
B21h—11 to 16 inches; reddish brown (5YR 4/3) very channery loamy sand; weak fine subangular blocky structure; loose; nonsticky, nonplastic; 65 percent coarse fragments; very strongly acid; clear smooth boundary.
B22ir—16 to 19 inches; dark reddish brown (5YR 3/3) very channery sandy loam; massive; friable; nonsticky, nonplastic; 60 percent coarse fragments; very strongly acid; abrupt wavy boundary.
B23ir—19 to 22 inches; dark reddish brown (5YR 3/4) very channery loamy sand; massive; firm; nonsticky, nonplastic; 65 percent coarse fragments; very strongly acid; clear wavy boundary.
B24—22 to 54 inches; yellowish brown (10YR 5/6) very flaggy sandy loam; massive; very weak medium subangular blocky structure; friable; nonsticky, nonplastic; 50 percent coarse fragments; very strongly acid; clear irregular boundary.
B25—54 to 60 inches; brown (7.5YR 5/4) flaggy sandy loam; massive; friable; slightly sticky, slightly plastic; 40 percent coarse fragments; very strongly acid; clear irregular boundary.
C1—60 to 76 inches; light yellowish brown (10YR 6/4) channery loamy sand; dark brown (7.5YR 4/4) horizontal streaks; massive; loose, firm in place; nonsticky, nonplastic; 30 percent coarse fragments; very strongly acid; diffuse irregular boundary.
C2—76 to 85 inches; brownish yellow (10YR 6/6) and light yellowish brown (10YR 6/4) very flaggy sandy loam; massive; firm; slightly sticky, slightly plastic; many clay films coating rock fragments; 80 percent coarse fragments; very strongly acid.

The solum is 35 to 70 inches thick. Bedrock is at a depth of 5 feet or more. Coarse fragments make up 35 to 65 percent of the control section. In unlimed areas reaction is very strongly acid and extremely acid throughout.

The A horizon has hue of 10YR, value of 2 to 6, and chroma of 1 or 2. The fine-earth texture is dominantly loamy sand.

The Bh and Bir horizons have hue of 10YR to 5YR, value of 3 or 4, and chroma of 3 to 6. The fine-earth texture is sandy loam, loamy sand, or loamy fine sand.

The B2 horizon has hue of 10YR or 7.5YR, value of 5 or 6, and chroma of 4 to 6. The fine-earth texture is dominantly sandy loam, sand, loamy sand, and loamy fine sand.

The C horizon has hue of 10YR or 7.5YR, value of 5 or 6, and chroma of 4 to 6. The fine-earth texture is sand, loamy sand, or loamy fine sand.

Nolo series

Soils of the Nolo series are fine-loamy, mixed, mesic Typic Fragiaquults. The soils are deep, poorly drained, and slowly permeable and are on uplands. They formed in material derived from acid gray sandstone and some shale and siltstone. Slopes range from 0 to 8 percent.

Nolo soils are associated on the landscape with deep, well drained Laidig and Hazleton soils; moderately well drained Cookport soils; and deep, well drained to excessively drained Leetonia soils.

Typical pedon of Nolo sandy loam, in an area of Nolo very stony sandy loam, 0 to 8 percent slopes, Adams Township, 1-1/4 mile east of Krayn, on strip mine road:

O1—2 inches to 1 inch; mat of trailing pine and leaves; birch, aspen, maple, and oak twigs and branches.
O2—1 inch to 0; decayed organic matter.
A1—0 to 2 inches; black (10YR 2/1) sandy loam; weak fine granular structure; very friable; 5 percent coarse fragments; very strongly acid; abrupt wavy boundary.
A2—2 to 6 inches; light brownish gray (10YR 6/2) sandy loam; weak medium granular structure; friable; 5 percent coarse fragments; very strongly acid; abrupt wavy boundary.
B1g—6 to 9 inches; light gray (10YR 6/1) channery loam; common medium distinct strong brown (7.5YR 5/8) mottles; moderate medium subangular blocky structure; firm; slightly sticky, plastic; 15 percent coarse fragments; very strongly acid; gradual wavy boundary.
B2tg—9 to 19 inches; gray (10YR 5/1) channery clay loam; many medium distinct strong brown (7.5YR 5/8) mottles; moderate medium subangular blocky structure; firm; sticky, plastic; common patches of clay film on ped faces; 20 percent coarse fragments; very strongly acid; gradual wavy boundary.
Bxg1—19 to 50 inches; gray (10YR 5/1) channery sandy clay loam; many medium distinct yellowish brown (10YR 5/4) mottles; moderate coarse prismatic structure parting to moderate medium platy; firm, brittle; sticky, plastic; 20 percent coarse fragments; very strongly acid; gradual wavy boundary.
C—50 to 60 inches; grayish brown (10YR 5/2) very channery loam; common medium distinct yellowish brown mottles; massive; firm; nonsticky, nonplastic; 50 percent coarse fragments; very strongly acid.

The solum is 40 to 55 inches thick. Bedrock is at a depth of more than 3-1/2 feet. The depth to the fragipan ranges from 16 to 30 inches. Coarse fragments make up 5 to 20 percent of the solum above the Bx and 10 to 35 percent of the Bx horizon. In unlimed areas reaction is very strongly acid or extremely acid throughout.

The A horizon has hue of 10YR or 2.5Y, value of 2 to 6, and chroma of 1 or 2. It is dominantly sandy loam but is loam and silt loam in some areas.

The B1 and Bt horizons have hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 0 to 2 and are mottled. They have a fine-earth texture that ranges from silt loam to sandy clay loam.

The Bx horizon has hue of 10YR or 7.5YR, value of 5 or 6, and chroma of 1 or 2 and are mottled. The fine-earth texture ranges from loam to sandy clay loam.

The C horizon has hue of 10YR or 7.5YR, value of 5 or 6, and chroma of 1 or 2 and are mottled. The fine-earth texture ranges from loam to clay loam.

Philo series

Soils of the Philo series are coarse-loamy, mixed, mesic Fluvaquentic Dystrochrepts. The soils are deep, moderately well drained, and moderately permeable to moderately slowly permeable and are on flood plains. They formed in alluvium washed mainly from sandstone, siltstone, and some shale. Slopes range from 0 to 3 percent.

Philo soils are associated on the landscape with well drained Pope soils and poorly drained Atkins soils.

Typical pedon of Philo silt loam, 1/2 mile east of Summerhill on Route 53, 1,360 feet south of road into the oxbow of the Little Conemaugh River:

Ap—0 to 5 inches; very dark grayish brown (10YR 3/2) silt loam; weak fine granular structure; friable; strongly acid; clear wavy boundary.
B1—5 to 18 inches; yellowish brown (10YR 5/6) silt loam; weak medium angular blocky structure; friable; strongly acid; gradual wavy boundary.
B2—18 to 26 inches; strong brown (7.5YR 5/6) silt loam; common medium distinct yellowish brown (10YR 5/4) and light brownish gray (10YR 6/2) mottles; weak medium angular blocky structure; friable; slightly sticky, slightly plastic; strongly acid; gradual wavy boundary.
C1—26 to 38 inches; light brownish gray (10YR 6/2) fine sandy loam; common medium distinct strong brown (7.5YR 5/6) mottles; massive; friable; strongly acid; clear smooth boundary.
C2—38 to 42 inches; light brownish gray (10YR 6/2) fine sandy loam; common medium distinct strong brown (7.5YR 5/6) mottles; massive; friable; strongly acid; clear smooth boundary.
IIC3—42 to 60 inches; stratified sand and gravel.

The solum is 20 to 48 inches thick. Bedrock is at a depth of 3-1/2 to 6 feet or more. The depth to low-chroma mottling ranges from 12 to 24 inches. Coarse fragments make up 0 to 20 percent of the control section. In unlimed areas reaction ranges from medium acid to very strongly acid.

The A horizon has hue of 10YR and 7.5YR, value of 3 or 4, and chroma of 2 or 3. The fine-earth texture is

dominantly silt loam but is loam and sandy loam in some areas.

The B horizon has hue of 10YR and 7.5YR, value of 4 to 6, and chroma of 3 to 6. The horizon has low- and high-chroma mottles at a depth of more than 12 inches. The fine-earth texture is silt loam to sandy loam.

The C horizon has hue of 10YR and 7.5YR, value of 4 to 6, and chroma of 0 to 2 and is mottled. The fine-earth texture is loam to sandy loam and layers of stratified sand and gravel.

Pope series

Soils of the Pope series are coarse-loamy, mixed, mesic Fluventic Dystrochrepts. The soils are deep, well drained, and moderately permeable and moderately rapidly permeable. They are on flood plains and formed in alluvium washed mainly from sandstone, siltstone, and some shale. Slopes range from 0 to 3 percent.

Pope soils are associated on the landscape with moderately well drained Philo soils and poorly drained Atkins soils.

Typical pedon of Pope silt loam, in White Township, about 1/2 mile northwest of Van Ormer on Route T406, 1,450 feet southwest of Route 53, west side of road:

Ap—0 to 9 inches; brown (10YR 4/3) silt loam; weak fine granular structure; friable; many fine grass roots; slightly acid; abrupt smooth boundary.
B2—9 to 19 inches; strong brown (7.5YR 5/6) sandy loam; moderate medium granular structure; friable; slightly acid; gradual wavy boundary.
B3—19 to 30 inches; yellowish brown (10YR 5/6) sandy loam; moderate medium granular structure; friable; slightly acid; gradual wavy boundary.
C—30 to 60 inches; yellowish brown (10YR 5/6) fine sandy loam; massive; friable; strongly acid.

The solum is 30 to 50 inches thick. Bedrock is at a depth of 40 to 60 inches or more. Coarse fragments make up 0 to 30 percent of the solum and 0 to 40 percent of the C horizon. In unlimed areas reaction ranges from strongly acid to extremely acid throughout.

The A horizon has hue of 10YR, value of 3 to 5, and chroma of 2 to 4. It is dominantly silt loam but ranges to sandy loam in some areas.

The B horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 3 to 6. The fine-earth texture ranges from sandy loam to silt loam.

The C horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 3 to 6. The fine-earth texture ranges from loamy sand to sandy clay loam or stratified layers of sand and gravel.

Rayne series

Soils of the Rayne series are fine-loamy, mixed, mesic Typic Hapludults. The soils are deep, well drained, and moderately permeable and are on uplands. They formed in material weathered from interbedded shale, siltstone, and fine-grained sandstone. Slopes range from 3 to 25 percent.

Rayne soils are associated on the landscape with moderately well drained Wharton soils, somewhat poorly drained Cavode soils, and moderately deep, well drained Gilpin soils.

Typical pedon of Rayne silt loam, 3 to 8 percent slopes, in Adams Township, about 1-1/4 miles south of South Fork, on Route T320, 1/4 mile west of Route 53, north side of road:

Ap—0 to 8 inches; dark brown (10YR 3/3) silt loam; weak fine subangular blocky structure; friable; 5 percent coarse fragments; strongly acid; abrupt smooth boundary.
B21t—8 to 14 inches; yellowish brown (10YR 5/4) silty clay loam; moderate fine subangular blocky structure; friable; thin continuous clay films on ped faces; 10 percent coarse fragments; strongly acid; gradual wavy boundary.
B22t—14 to 30 inches; yellowish brown (10YR 5/6) silty clay loam; moderate medium subangular blocky structure; firm; thin continuous clay films on ped faces; 10 percent coarse fragments; strongly acid; gradual wavy boundary.
B23t—30 to 36 inches; yellowish brown (10YR 5/6) silty clay loam; weak fine to medium subangular blocky structure; firm; few thin patchy clay films on ped faces; 10 percent coarse fragments; strongly acid; gradual wavy boundary.
B3—36 to 40 inches; yellowish brown (10YR 5/6) shaly silty clay loam; weak medium subangular blocky structure; firm; few patchy clay films on ped faces; 20 percent coarse fragments; strongly acid; gradual wavy boundary.
C—40 to 60 inches; yellowish brown (10YR 5/4) very shaly silty clay loam; massive; firm; 60 percent coarse fragments; strongly acid.

The solum is 40 to 50 inches thick. Bedrock is at a depth of 3-1/2 to 6 feet. Coarse fragments make up 5 to 20 percent of the upper part of the solum, 20 to 40 percent of the lower part of the solum, and 20 to 80 percent of the C horizon. In unlimed areas reaction is strongly acid and very strongly acid throughout.

The A horizon has hue of 10YR, value of 3 to 5, and chroma of 2 or 3. The fine-earth texture is dominantly silt loam but is loam in some areas.

The B horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 to 6. The fine-earth texture ranges from loam to silty clay loam.

The C horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 to 6. The fine-earth texture ranges from silt loam to sandy clay loam.

Udorthents

Udorthents are shallow to deep, excessively drained to somewhat poorly drained, rapidly permeable to slowly permeable soils on uplands. They formed in mixtures of soil and unconsolidated rock material derived mainly from sandstone, shale, and siltstone.

Udorthents are associated on the landscape with deep, well drained Hazleton, Rayne, and Laidig soils; moderately deep, well drained Gilpin soils; deep, moderately well drained Cookport and Wharton soils; and somewhat poorly drained Cavode soils.

Because of the variability of Udorthents, a typical pedon is not described. The solum ranges from 1 to 10 inches thick, and some areas do not have a solum. The depth to bedrock ranges from 10 inches to more than 6 feet. The content of coarse fragments ranges from 10 to 80 percent throughout. In unlimed areas reaction is extremely acid to slightly acid throughout. The soils have hue of 5YR to 2.5Y, value of 2 to 6, and chroma of 2 to 8. The fine-earth texture ranges from sandy loam to silty clay loam.

Weikert Series

Soils of the Weikert series are loamy-skeletal, mixed, mesic Lithic Dystrochrepts. The soils are shallow, well drained, and moderately rapidly permeable and are on uplands. They formed in residuum derived from acid shale, siltstone, and fine-grained sandstone. Slopes range from 3 to 70 percent.

Weikert soils are associated on the landscape with well drained, moderately deep Berks and Gilpin soils.

Typical pedon of Weikert silt loam, in an area of Gilpin-Weikert channery silt loams, 3 to 8 percent slopes, on Route 11063, 3/4 mile from its intersection with Route T858, towards Flinton, north side of road:

Ap—0 to 9 inches; dark brown (10YR 4/3) channery silt loam; weak fine granular structure; friable, slightly sticky, slightly plastic; 30 percent coarse fragments; medium acid; abrupt smooth boundary.

B—9 to 19 inches; yellowish brown (10YR 5/6) very channery silt loam; weak fine subangular blocky structure; friable; sticky, plastic; 50 percent coarse fragments; strongly acid; clear wavy boundary.

R—19 inches; fractured dark gray (10YR 4/1) shale.

The solum is 10 to 20 inches thick. Bedrock is at a depth of 10 to 20 inches. Coarse fragments make up 20 to 50 percent of the Ap horizon, 30 to 65 percent of the B horizon, and 60 to 85 percent of the C horizon. In unlimed areas reaction ranges from medium acid to very strongly acid throughout.

The A horizon has hue of 10YR, value of 2 to 5, and chroma of 2 to 6. The fine-earth texture is silt loam and loam.

The C horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 3 to 6. The fine-earth texture is silt loam and loam.

Wharton series

Soils of the Wharton series are fine-loamy, mixed, mesic Aquic Hapludults. The soils are deep, moderately well drained, and slowly permeable or moderately slowly permeable. They are on uplands and formed in material weathered from interbedded clay shale and siltstone. Slopes range from 3 to 25 percent.

Wharton soils are associated on the landscape with well drained, moderately deep Gilpin soils; moderately well drained, moderately deep Blairton soils; and somewhat poorly drained Cavode soils.

Typical pedon of Wharton silt loam, 3 to 8 percent slopes, in Susquehanna Township, 1-1/4 miles north of Barnesboro on Route 565, 660 feet west of Route 11087, 100 feet north of road:

A1—0 to 3 inches; very dark brown (10YR 2/2) silt loam; weak fine granular structure; very friable; strongly acid; clear smooth boundary.

B2—3 to 8 inches; dark yellowish brown (10YR 4/4) silt loam; weak fine granular structure; very friable; strongly acid; clear wavy boundary.

B21t—8 to 16 inches; yellowish brown (10YR 5/6) silty clay loam; weak medium angular blocky structure; friable; patchy clay films on ped faces; 10 percent coarse fragments; strongly acid; gradual wavy boundary.

B22t—16 to 26 inches; strong brown (7.5YR 5/6) silty clay loam; common medium distinct yellowish red (5YR 5/8) and gray (10YR 6/1) mottles; strong medium angular blocky structure; firm; thin continuous clay films on ped faces; 10 percent coarse fragments; strongly acid; gradual wavy boundary.

B23t—26 to 36 inches; grayish brown (10YR 5/2) silty clay loam; common medium distinct yellowish brown (10YR 5/6) and dark gray (10YR 4/1) mottles; moderate coarse angular blocky structure; thin continuous clay films on ped faces; firm; strongly acid; 10 percent coarse fragments; gradual wavy boundary.

B3—36 to 46 inches; pale brown (10YR 6/3) silty clay loam; many fine prominent yellowish brown (10YR 5/6) and strong brown (7.5YR 5/6) mottles; weak medium angular blocky structure; friable; 10 percent coarse fragments; very strongly acid; gradual wavy boundary.

C—46 to 60 inches; brown (10YR 5/3) very shaly silt loam; many fine faint yellowish brown (10YR 5/4) and pale brown (10YR 6/3) mottles; weak thick platy structure; friable; 50 percent coarse fragments; very strongly acid.

The solum is 30 to 60 inches thick. Bedrock is at a depth of 4 to 6 feet or more. Coarse fragments make up 0 to 15 percent of the Ap and B2t horizons, 5 to 50 percent of the B3 horizon, and 20 to 80 percent of the C horizon. In unlimed areas reaction is strongly acid and very strongly acid in the solum and very strongly acid and extremely acid in the C horizon.

The A horizon has hue of 10YR, value of 2 to 5, and chroma of 2 to 6. The fine-earth texture is silt loam.

The B horizon has hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 2 to 6. Some pedons have faces of prisms and peds with hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 1 to 4. Mottles with value of 4 or more and chroma of 0 to 2 or more are in the upper 24 inches of the Bt horizon. The fine-earth texture of the B horizon ranges from silt loam to clay loam.

The C horizon has hue of 10YR, value of 4 or 5, and chroma of 2 to 6 and is mottled. The fine-earth texture ranges from silt loam to clay.

formation of the soils

The characteristics of a soil at any given site depend on the physical and mineralogical composition of the parent material, the climate under which the soil material has accumulated and remained, the plant and animal life on and in the soil, the relief, or lay of the land, and the length of time the forces of soil formation have acted on the soil material.

Climate and plant and animal life are the active forces that change the parent material into a soil that has genetically related layers. The effects of climate and plant and animal life are influenced by relief and by the nature of the parent material. In some cases, the parent material dominates the other factors of soil formation. Finally, time is needed to change the parent material into a series of layers, or a soil profile. A long time usually is needed for the development of distinct soil layers.

The factors of soil formation are so closely related in their effects on the soil that few generalizations can be made about the effect of any one unless conditions are specified for the other four.

parent material

Parent material is the unconsolidated mass from which a soil forms. It is composed of varying amounts of sand, silt, and clay and has various kinds and amounts of chemicals. All the other soil-forming factors affect parent material, but the parent material determines the chemical and mineralogical composition of the soil.

In Cambria County most of the soils on uplands formed in material weathered from interbedded shale, sandstone, siltstone, and clay shale. The reddish, loamy Leck Kill and Albrights soils show the dominance of interbedded red shale, siltstone, and fine-grained sandstone in their parent material. The shaly subsoil of Weikert and Berks soils shows the dominance of brownish and grayish shale in their parent material. The channery and sandy subsoil of Hazleton soils shows the dominance of sandstone in their parent material. The subsoil of soils on flood plains, such as Pope, Philo, and Atkins soils, reflects the stratified nature of alluvium.

climate

Temperature, humidity, wind, and precipitation in the form of snow and an average of over 38 inches of annual rainfall have influenced the formation of soils in Cambria County. Ample precipitation, gentle relief, and a dense or clayey substratum have caused a high water table in many soils. This water table accounts for the grayish color of the wetter soils, such as Armagh and Brinkerton soils. The cool temperatures and heavy precipitation have influenced the acidity of the soils and contributed to the yellowish colors that are common in some soils in Cambria County; Rayne and Hazleton soils are examples of such soils.

plant and animal life

The climate of Cambria County favors the growth of hardwood and softwood trees, and many of the soils in the county formed in forested areas. Leaves, twigs, roots, and entire plants accumulate on the surface of forested soils. Organic matter is added to the soil as plant remains decompose through the action of micro-organisms, earthworms, and other forms of life. The uprooting of trees also influences soil formation by mixing the soil and loosening the underlying material.

Man also has influenced the direction and rate of soil formation. He has altered the soils by installing drainage, changing the vegetation, tilling and compacting the soils, and changing the amount of organic matter.

relief

Relief affects runoff and internal drainage. Runoff, in turn, influences the degree of erosion and the soil depth. Internal drainage affects the weathering of the soil material and the underlying bedrock. Steep soils commonly have a restricted depth because of a rapid rate of runoff and erosion. The steep, shallow Weikert soils, for example, lose soil material almost as fast as it forms. Ernest soils, however, formed in colluvium at the base of steep slopes, where the constant downslope movement of soil material increases the depth of the soil.

time

The effect of climate, relief, and living organisms in changing parent material into soil is governed by the time that these factors have been in action. The degree of soil development generally indicates the age of a soil. The Pope, Philo, and Atkins soils, which are on flood plains, are younger than most other soils in the county.

Organic matter has accumulated on the surface of these soils, but the layers below the organic matter are less distinct than those in most soils on uplands.

On the uplands, Hazleton and Berks soils have layers that show some changes have taken place, but these changes are not the result of advanced weathering or soil formation. Weathering of these soils was slowed by the effects of topography and by the parent material. Rayne, Wharton, and Laidig soils are examples of soils in the county that are well developed.

geology

Joseph N. Van, geologist, Soil Conservation Service, assisted in preparing this section.

Cambria County is in the Appalachian Plateaus physiographic province, a division of the Appalachian Highlands. Most of the county is high and rolling, but it is deeply dissected by the Conemaugh River in the vicinity of Johnstown.

The county is bordered on the east by the Allegheny Mountains, a part of which stands 2,860 feet above sea level, the highest point in the county. Laurel Hill, which forms the southwestern border of the county, has an elevation of 2,780 feet at one place. The Conemaugh River crosses the Westmoreland County line at an elevation of about 1,110 feet, the lowest point in the county.

A watershed divide crosses the northern part of Cambria County, connecting the towns of Nicktown and Summit. North and east of this divide, the water flows to the Atlantic Ocean chiefly down the West Branch of the Susquehanna River but in part down the Juniata River. The southern and larger part of the county drains into the Ohio River through the Conemaugh River and its tributaries.

The prominent geologic structure in the county is the Laurel Hill anticline, originating at the southwestern border of the county and extending in a northeasterly direction to the northern border of the county (*4*). Along the southeastern boundary of the county is the Allegheny front, located on the western flank of the Appalachian Valley and Ridge province. In the middle of the county lies the northeast-trending Ebensburg anticline, the Johnstown-Bradley syncline, and the Wilmore syncline.

The age of the bedrock of the county ranges from the youngest Monongahela Formation, which is Pennsylvanian in age, to the oldest Catskill Formation, which is Devonian in age (*3*). There are no major unconsolidated deposits in the county, as the streams are still actively deepening their channels. Only a few acres of the Monongahela Formation are in the county and are located east of Ehrenfeld. These youngest Paleozoic rocks consist of shale, clay, sandstone, limestone, and, at the base, Pittsburgh coal. The Gilpin-Ernest-Wharton general soil map association is dominant in this area.

The Conemaugh Formation, Upper Pennsylvanian in age, occupies practically the whole county and consists of a variable sequence of sandstone, shale, clay, thin coal beds, thin limestone beds, and a few beds of red shale. All four of the general soil map associations in the county are in this formation.

The underlying Allegheny Formation, Middle Pennsylvanian in age, is exposed along the east flank of Laurel Hill and the west flank of the Allegheny Mountain and crops out in valleys where it was brought up by anticlines. The bedrock of the Allegheny Formation consists of a variable sequence of sandstone, shale, limestone, clay, and most of the workable coal beds. The Cookport-Hazleton-Laidig association and the Gilpin-Ernest-Wharton association are dominant in this area.

The Pottsville Formation, Lower Pennsylvanian in age, underlies the Allegheny Formation and crops out along Laurel Hill and the Allegheny Mountain and consists of several coal beds, massive sandstones, clay, shale, and some local conglomerates. The soils of the Cookport-Hazleton-Laidig general soil map association are dominant in this formation.

The Upper and Lower Mississippian beds are composed of the Mauch Chunk shales and sandstones, a few local limestones, the Pocono sandstones, clays, gray and red shales, and some local conglomerates. These Mississippian beds also crop out along the east flank of the Laurel Hill anticline and the west flank of the Allegheny Mountains and are in the Cookport-Hazleton-Laidig general soil map association.

The oldest rock exposed in Cambria County is a small outcrop of red Catskill shale and sandstone, Upper Devonian in age, in a notch of the Laurel Hill anticline northwest of Johnstown. The major soils in this area are of the Cookport-Hazleton-Laidig general soil map association.

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glossary

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Area reclaim (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Association, soil. A group of soils geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 40-inch profile or to a limiting layer is expressed as—

	Inches
Very low	0 to 2.4
Low	2.4 to 3.2
Moderate	3.2 to 5.2
High	More than 5.2

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

Channery soil. A soil that is, by volume, more than 15 percent thin, flat fragments of sandstone, shale, slate, limestone, or schist as much as 6 inches along the longest axis. A single piece is called a fragment.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Coarse fragments. Mineral or rock particles up to 3 inches (2 millimeters to 7.5 centimeters) in diameter.

Coarse textured soil. Sand or loamy sand.

Colluvium. Soil material, rock fragments, or both moved by creep, slide, or local wash and deposited at the base of steep slopes.

Complex slope. Irregular or variable slope. Planning or constructing terraces, diversions, and other water-control measures on a complex slope is difficult.

Complex, soil. A map unit of two or more kinds of soil in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils are somewhat similar in all areas.

Compressible (in tables). Excessive decrease in volume of soft soil under load.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are—

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard; little affected by moistening.

Contour stripcropping (or contour farming). Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Corrosive. High risk of corrosion to uncoated steel or deterioration of concrete.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of

regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Deferred grazing. Postponing grazing or arresting grazing for a prescribed period.

Depth to rock. Bedrock is too near the surface for the specified use.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:

Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.

Somewhat excessively drained.—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.

Well drained.—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.

Moderately well drained.—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically for long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum, or periodically receive high rainfall, or both.

Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.

Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.

Very poorly drained.—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients.

Drainage, surface. Runoff, or surface flow of water, from an area.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of the activities of man or other animals or of a catastrophe in nature, for example, fire, that exposes the surface.

Excess fines (in tables). Excess silt and clay in the soil. The soil does not provide a source of gravel or sand for construction purposes.

Fast intake (in tables). The rapid movement of water into the soil.

Favorable. Favorable soil features for the specified use.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Fine textured soil. Sandy clay, silty clay, and clay.

Flooding. The temporary covering of soil with water from overflowing streams, runoff from adjacent slopes, and tides. Frequency, duration, and probable dates of occurrence are estimated. Frequency is expressed as none, rare, occasional and frequent. None means that flooding is not probable; rare that it is unlikely but possible under unusual weather conditions; occasional that it occurs on an average of once or less in 2 years; and frequent that it occurs on an average of more than once in 2 years. Duration is expressed as very brief if less than 2 days, brief if 2 to 7 days, and long if more than 7 days. Probable dates are expressed in months;

November-May, for example, means that flooding can occur during the period November through May. Water standing for short periods after rainfall or commonly covering swamps and marshes is not considered flooding.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Foot slope. The inclined surface at the base of a hill.

Forb. Any herbaceous plant not a grass or a sedge.

Fragipan. A loamy, brittle subsurface horizon low in porosity and content of organic matter and low or moderate in clay but high in silt or very fine sand. A fragipan appears cemented and restricts roots. When dry, it is hard or very hard and has a higher bulk density than the horizon or horizons above. When moist, it tends to rupture suddenly under pressure rather than to deform slowly.

Frost action (in tables). Freezing and thawing of soil moisture. Frost action can damage roads, buildings and other structures, and plant roots.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors and mottles.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock up to 3 inches (2 millimeters to 7.5 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that is 15 to 50 percent, by volume, rounded or angular rock fragments, not prominently flattened, up to 3 inches (7.5 centimeters) in diameter.

Ground water (geology). Water filling all the unblocked pores of underlying material below the water table.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an upper case letter represents the major horizons. Numbers or lower case letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the *Soil Survey Manual*. The major horizons of mineral soil are as follows:

O horizon.—An organic layer of fresh and decaying plant residue at the surface of a mineral soil.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

B horizon.—The mineral horizon below an A horizon. The B horizon is in part a layer of transition from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) prismatic or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these. The combined A and B horizons are generally called the solum, or true soil. If a soil does not have a B horizon, the A horizon alone is the solum.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the A or B horizon. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, the Roman numeral II precedes the letter C.

R layer.—Consolidated rock beneath the soil. The rock commonly underlies a C horizon, but can be directly below an A or a B horizon.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Large stones (in tables). Rock fragments 3 inches (7.5 centimeters) or more across. Large stones adversely affect the specified use of the soil.

Leaching. The removal of soluble material from soil or other material by percolating water.

Light textured soil. Sand and loamy sand.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Low strength. The soil is not strong enough to support loads.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous areas. Areas that have little or no natural soil and support little or no vegetation.

Moderately coarse textured soil. Sandy loam and fine sandy loam.

Moderately fine textured soil. Clay loam, sandy clay loam, and silty clay loam.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few, common,* and *many*; size—*fine, medium,* and *coarse*; and contrast—*faint, distinct,* and *prominent*. The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium*, from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse*, more than 15 millimeters (about 0.6 inch).

Munsell notation. A designation of color by degrees of the three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color of 10YR hue, value of 6, and chroma of 4.

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Parent material. The unconsolidated organic and mineral material in which soil forms.

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The downward movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil adversely affecting the specified use.

Permeability. The quality of the soil that enables water to move downward through the profile. Permeability is measured as the number of inches per hour that water moves downward through the saturated soil. Terms describing permeability are:

Very slow	less than 0.06 inch
Slow	0.06 to 0.20 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management. For example, slope, differences in slope, stoniness, and thickness.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Piping (in tables). Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Poorly graded. Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Poor outlets (in tables). Refers to areas where surface or subsurface drainage outlets are difficult or expensive to install.

Productivity (soil). The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Reaction, soil. A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degree of acidity or alkalinity is expressed as—

	pH
Extremely acid	Below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Relief. The elevations or inequalities of a land surface, considered collectively.

Residuum (residual soil material). Unconsolidated, weathered, or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Rooting depth (in tables). Shallow root zone. The soil is shallow over a layer that greatly restricts roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandstone. Sedimentary rock containing dominantly sand-size particles.

Seepage (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the underlying material. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Shale. Sedimentary rock formed by the hardening of a clay deposit.

Shrink-swell. The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Siltstone. Sedimentary rock made up of dominantly silt-sized particles.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75 feet.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Slow intake (in tables). The slow movement of water into the soil.

Slow refill (in tables). The slow filling of ponds, resulting from restricted permeability in the soil.

Small stones (in tables). Rock fragments less than 3 inches (7.5 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Soil separates. Mineral particles less than 2 mm in equivalent diameter and ranging between specified size limits. The names and sizes of separates recognized in the United States are as follows:

	Millimeters
Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	Less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and plant and animal activities are largely confined to the solum.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter.

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Stratified. Arranged in strata, or layers. The term refers to geologic material. Layers in soils that result from the processes of soil formation are called horizons; those inherited from the parent material are called strata.

Stripcropping. Growing crops in a systematic arrangement of strips or bands which provide vegetative barriers to wind and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular. Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Substratum. The part of the soil below the solum.

Subsurface layer. Technically, the A2 horizon. Generally refers to a leached horizon lighter in color and lower in content of organic matter than the overlying surface layer.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series

because they differ in ways too small to be of consequence in interpreting their use and behavior.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt, silt loam, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or " very fine."

Thin layer (in tables). Otherwise suitable soil material too thin for the specified use.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the low lands along streams.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

Well graded. Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

Month	Temperature[1]						Precipitation[1]				
	Average daily maximum	Average daily minimum	Average	2 years in 10 will have-- Maximum temperature higher than--	2 years in 10 will have-- Minimum temperature lower than--	Average number of growing degree days[2]	Average	2 years in 10 will have-- Less than--	2 years in 10 will have-- More than--	Average number of days with 0.10 inch or more	Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In
January	35.5	16.0	25.8	62	-16	21	3.96	2.66	5.14	10	24.4
February	35.9	14.6	25.3	60	-16	0	3.57	2.25	4.76	9	32.3
March	46.0	23.4	34.7	75	-3	58	4.36	2.90	5.68	11	24.9
April	58.8	32.4	45.6	83	12	186	4.29	2.73	5.69	10	5.8
May	68.9	41.5	55.2	88	21	476	4.53	3.08	5.85	11	.0
June	77.4	50.1	63.8	90	32	714	4.65	2.52	6.38	10	.0
July	80.9	53.9	67.4	92	38	849	4.52	3.07	5.84	8	.0
August	79.1	53.0	66.1	90	35	809	4.24	3.24	5.16	8	.0
September	72.9	47.0	60.0	89	27	600	4.31	2.78	5.68	8	.0
October	62.2	36.2	49.2	81	15	305	2.88	1.80	3.84	7	.7
November	49.3	29.6	39.5	73	3	81	3.79	2.87	4.64	9	8.9
December	38.4	21.2	29.8	66	-5	20	4.19	2.82	5.44	11	22.7
Year	58.8	34.9	46.9	92	-19	4,119	49.29	43.56	54.82	112	119.7

[1]Recorded in the period 1964-75 at Ebensburg, Pa.

[2]A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (40° F).

TABLE 2.--FREEZE DATES IN SPRING AND FALL

Probability	Temperature[1]		
	24° F or lower	28° F or lower	32° F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	May 6	May 20	June 8
2 years in 10 later than--	May 1	May 15	June 2
5 years in 10 later than--	April 20	May 4	May 21
First freezing temperature in fall:			
1 year in 10 earlier than--	October 6	September 19	September 11
2 years in 10 earlier than--	October 12	September 27	September 16
5 years in 10 earlier than--	October 24	October 11	September 26

[1]Recorded in the period 1964-75 at Ebensburg, Pa.

TABLE 3.--GROWING SEASON

Probability	Daily minimum temperature during growing season[1]		
	Higher than 24° F	Higher than 28° F	Higher than 32° F
	Days	Days	Days
9 years in 10	157	131	99
8 years in 10	167	141	109
5 years in 10	186	160	128
2 years in 10	205	179	146
1 year in 10	214	189	156

[1]Recorded in the period 1964-75 at Ebensburg, Pa.

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
AbB	Albrights silt loam, 3 to 8 percent slopes	974	0.2
AbC	Albrights silt loam, 8 to 15 percent slopes	460	0.1
AmB	Armagh silt loam, 0 to 8 percent slopes	1,583	0.4
At	Atkins silt loam	9,454	2.1
BeB	Berks channery silt loam, 3 to 8 percent slopes	1,315	0.3
BeC	Berks channery silt loam, 8 to 15 percent slopes	848	0.2
BeD	Berks channery silt loam, 15 to 25 percent slopes	1,011	0.2
BmB	Blairton silt loam, 3 to 8 percent slopes	7,279	1.6
BmC	Blairton silt loam, 8 to 15 percent slopes	2,526	0.6
BnB	Blairton very stony silt loam, 3 to 8 percent slopes	720	0.2
BpC	Blairton-Berks channery silt loams, 8 to 15 percent slopes	1,559	0.4
BtB	Brinkerton silt loam, 0 to 8 percent slopes	21,677	4.9
BvB	Brinkerton very stony silt loam, 0 to 8 percent slopes	2,569	0.6
CaA	Cavode silt loam, 0 to 3 percent slopes	1,000	0.2
CaB	Cavode silt loam, 3 to 8 percent slopes	13,737	3.1
CaC	Cavode silt loam, 8 to 15 percent slopes	2,473	0.6
CbB	Cavode very stony silt loam, 0 to 8 percent slopes	1,048	0.2
CeA	Cookport and Ernest soils, 0 to 3 percent slopes	823	0.2
CeB	Cookport and Ernest soils, 3 to 8 percent slopes	29,380	6.6
CeC	Cookport and Ernest soils, 8 to 15 percent slopes	16,791	3.8
CeD	Cookport and Ernest soils, 15 to 25 percent slopes	1,943	0.4
CvB	Cookport and Ernest very stony soils, 0 to 8 percent slopes	37,036	8.2
CvD	Cookport and Ernest very stony soils, 8 to 25 percent slopes	24,378	5.5
Dp	Dumps, industrial wastes	452	0.1
Du	Dumps, mine	2,345	0.5
GnB	Gilpin silt loam, 3 to 8 percent slopes	14,920	3.4
GpB	Gilpin very stony silt loam, 3 to 8 percent slopes	2,669	0.6
GpD	Gilpin very stony silt loam, 8 to 25 percent slopes	4,560	1.0
GtC	Gilpin-Rayne silt loams, 8 to 15 percent slopes	10,984	2.5
GtD	Gilpin-Rayne silt loams, 15 to 25 percent slopes	5,089	1.1
GwB	Gilpin-Weikert channery silt loams, 3 to 8 percent slopes	2,919	0.7
GwC	Gilpin-Weikert channery silt loams, 8 to 15 percent slopes	3,637	0.8
GwD	Gilpin-Weikert channery silt loams, 15 to 25 percent slopes	3,608	0.8
GWF	Gilpin-Weikert channery silt loams, 25 to 70 percent slopes	8,472	1.9
HaB	Hazleton channery loam, 3 to 8 percent slopes	11,845	2.7
HaC	Hazleton channery loam, 8 to 15 percent slopes	4,992	1.1
HaD	Hazleton channery loam, 15 to 25 percent slopes	3,161	0.7
HbB	Hazleton very stony loam, 3 to 8 percent slopes	11,078	2.5
HbD	Hazleton very stony loam, 8 to 25 percent slopes	17,715	4.0
Hx	Hazleton extremely bouldery sandy loam	569	0.1
LaB	Laidig loam, 3 to 8 percent slopes	11,600	2.6
LaC	Laidig loam, 8 to 15 percent slopes	6,132	1.4
LDF	Laidig soils, 25 to 70 percent slopes	35,518	8.0
LkB	Leck Kill silt loam, 3 to 8 percent slopes	400	0.1
LkC	Leck Kill silt loam, 8 to 15 percent slopes	610	0.1
LkD	Leck Kill silt loam, 15 to 25 percent slopes	330	0.1
LtB	Leetonia very stony loamy sand, 3 to 8 percent slopes	3,983	0.9
NoB	Nolo very stony sandy loam, 0 to 8 percent slopes	4,326	1.0
Ph	Philo silt loam	2,315	0.5
Po	Pope silt loam	2,034	0.5
RaB	Rayne silt loam, 3 to 8 percent slopes	552	0.1
RaC	Rayne silt loam, 8 to 15 percent slopes	273	0.1
RaD	Rayne silt loam, 15 to 25 percent slopes	738	0.2
UDC	Udorthents, strip mine, sloping	7,481	1.7
UDF	Udorthents, strip mine, steep	7,954	1.8
URB	Urban land-Udorthents complex, gently sloping	4,616	1.0
URC	Urban land-Udorthents complex, sloping	8,930	2.0
WaB	Wharton silt loam, 3 to 8 percent slopes	15,788	3.5
WaC	Wharton silt loam, 8 to 15 percent slopes	3,324	0.7
WgC	Wharton-Gilpin silt loams, 8 to 15 percent slopes	19,770	4.4
WgD	Wharton-Gilpin silt loams, 15 to 25 percent slopes	16,839	3.8
W	Water	1,688	0.4
	Total	444,800	100.0

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE

[Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil]

Soil name and map symbol	Corn	Corn silage	Oats	Wheat	Alfalfa hay	Grass-legume hay	Pasture
	Bu	Ton	Bu	Bu	Ton	Ton	AUM*
AbB---- Albrights	100	20	70	40	3.5	3.0	6.5
AbC---- Albrights	90	18	65	40	3.5	3.0	6.5
AmB---- Armagh	80	16	60	---	---	2.5	5.0
At---- Atkins	100	20	60	30	---	3.0	5.5
BeB---- Berks	80	16	60	30	3.5	3.0	6.5
BeC---- Berks	75	15	55	35	3.0	2.5	5.5
BeD---- Berks	70	14	50	30	3.0	2.5	5.5
BmB---- Blairton	75	15	60	35	---	2.5	5.0
BmC---- Blairton	70	14	55	30	---	2.0	4.0
BnB---- Blairton	---	---	---	---	---	---	---
BpC---- Blairton-Berks	72	14	55	32	---	2.0	4.5
BtB---- Brinkerton	90	18	60	---	---	2.5	5.0
BvB---- Brinkerton	---	---	---	---	---	---	---
CaA---- Cavode	85	17	65	35	---	3.0	5.5
CaB---- Cavode	85	17	65	35	---	3.0	5.5
CaC---- Cavode	80	16	60	30	---	3.0	5.5
CbB---- Cavode	---	---	---	---	---	---	---
CeA---- Cookport and Ernest	100	20	65	40	3.3	3.0	6.5
CeB---- Cookport and Ernest	100	20	65	40	3.5	3.0	6.5
CeC---- Cookport and Ernest	95	19	60	35	3.5	3.0	6.5
CeD---- Cookport and Ernest	90	18	55	35	3.0	2.5	5.5

See footnotes at end of table.

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Corn	Corn silage	Oats	Wheat	Alfalfa hay	Grass-legume hay	Pasture
	Bu	Ton	Bu	Bu	Ton	Ton	AUM*
CvB---- Cookport and Ernest	---	---	---	---	---	---	---
CvD---- Cookport and Ernest	---	---	---	---	---	---	---
Dp**, Du**. Dumps							
GnB---- Gilpin	90	18	65	40	3.5	3.0	7
GpB---- Gilpin	---	---	---	---	---	---	---
GpD---- Gilpin	---	---	---	---	---	---	---
GtC---- Gilpin-Rayne	90	18	65	35	4.0	3.0	7.0
GtD---- Gilpin-Rayne	85	17	60	35	3.5	2.5	6.5
GwB---- Gilpin-Weikert	80	16	60	35	3.0	2.5	6.5
GwC---- Gilpin-Weikert	75	15	55	30	3.0	2.5	6.5
GwD---- Gilpin-Weikert	70	14	50	30	3.0	2.5	6.0
GWF---- Gilpin-Weikert	---	---	---	---	---	---	---
HaB---- Hazleton	125	25	75	45	4.5	3.5	8.0
HaC---- Hazleton	115	23	70	40	4.5	3.5	8.0
HaD---- Hazleton	110	22	60	35	4.0	3.0	7.5
HbB---- Hazleton	---	---	---	---	---	---	4.0
HbD---- Hazleton	---	---	---	---	---	---	3.5
Hx---- Hazleton	---	---	---	---	---	---	---
LaB---- Laidig	100	20	70	40	4.0	3.0	7.5
LaC---- Laidig	95	19	65	35	4.0	3.0	7.5
LDF---- Laidig	---	---	---	---	---	---	---
LkB---- Leck Kill	125	25	75	50	4.5	3.5	8.0
LkC---- Leck Kill	120	24	70	50	4.0	3.5	7.5

See footnotes at end of table.

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Corn	Corn silage	Oats	Wheat	Alfalfa hay	Grass-legume hay	Pasture
	Bu	Ton	Bu	Bu	Ton	Ton	AUM*
LkD---- Leck Kill	105	21	65	45	4.0	3.0	7.5
LtB---- Leetonia	---	---	---	---	---	---	---
NoB---- Nolo	---	---	---	---	---	---	---
Ph---- Philo	130	26	80	45	4.5	3.5	8.5
Po---- Pope	130	26	80	45	5.0	3.5	8.5
RaB---- Rayne	110	22	75	45	4.5	3.5	8.5
RaC---- Rayne	100	20	70	40	4.5	3.5	8.5
RaD---- Rayne	95	19	65	40	4.0	3.0	7.5
UDC**, UDF**. Udorthents							
URB---- Urban land-Udorthents	---	---	---	---	---	---	---
URC---- Urban land-Udorthents	---	---	---	---	---	---	---
WaB---- Wharton	90	18	65	40	3.5	3.0	6.5
WaC---- Wharton	80	16	60	35	3.5	3.0	6.5
WgC---- Wharton-Gilpin	80	16	60	35	3.5	3.0	6.0
WgD---- Wharton-Gilpin	75	15	55	30	3.0	2.5	5.5

* Animal-unit-month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

** See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 6.--CAPABILITY CLASSES AND SUBCLASSES

[Miscellaneous areas are excluded. Absence of an entry indicates no acreage]

Class	Total acreage	Major management concerns (Subclass)		
		Erosion (e)	Wetness (w)	Soil problem (s)
		Acres	Acres	Acres
I	2,034	---	---	---
II	92,831	89,693	3,138	---
III	101,764	70,294	31,470	---
IV	60,064	36,804	23,260	---
V	---	---	---	---
VI	104,377	1,190	---	103,187
VII	51,454	43,990	---	7,464
VIII	---	---	---	---

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY

[Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available]

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	
AbB---- Albrights	3o	Slight	Slight	Slight	Slight	Northern red oak----	70	Red pine, eastern white pine, Japanese larch, Norway spruce, white spruce.
						Yellow-poplar-------	80	
						White ash----------	70	
						Red maple----------	70	
AbC---- Albrights	3o	Slight	Slight	Slight	Slight	Northern red oak----	70	Red pine, eastern white pine, Japanese larch, Norway spruce, white spruce.
						Yellow-poplar-------	80	
						White ash----------	70	
						Red maple----------	70	
AmB---- Armagh	3w	Slight	Severe	Severe	Severe	Northern red oak----	73	Eastern white pine, white spruce, Japanese larch.
At---- Atkins	1w	Slight	Severe	Severe	Moderate	Pin oak----------	100	Eastern white pine, white spruce, Japanese larch.
						Red maple----------	85	
						American sycamore---	85	
BeB, BeC---- Berks	3f	Slight	Slight	Moderate	Slight	Northern red oak----	70	Virginia pine, eastern white pine, Japanese larch, Norway spruce, red pine.
						Black oak----------	70	
						Virginia pine-------	70	
BeD---- Berks	3f	Slight	Moderate	Moderate	Slight	Northern red oak----	70	Virginia pine, eastern white pine, Japanese larch, Norway spruce, red pine.
						Black oak----------	70	
						Virginia pine-------	70	
BmB---- Blairton	3w	Slight	Moderate	Slight	Slight	Northern red oak----	70	Yellow-poplar, Japanese larch, eastern white pine, Norway spruce.
						White ash----------	70	
						Sugar maple---------	70	
						Yellow-poplar-------	80	
BmC, BnB---- Blairton	3w	Slight	Moderate	Slight	Slight	Northern red oak----	70	Yellow-poplar, Japanese larch, eastern white pine, Norway spruce.
						White ash----------	70	
						Sugar maple---------	70	
						Yellow-poplar-------	80	
BpC*:								
Blairton----------	3w	Slight	Moderate	Slight	Slight	Northern red oak----	70	Yellow-poplar, Japanese larch, eastern white pine, Norway spruce.
						White ash----------	70	
						Sugar maple---------	70	
						Yellow-poplar-------	80	
Berks----------	3f	Slight	Slight	Moderate	Slight	Northern red oak----	70	Virginia pine, eastern white pine, Japanese larch, Norway spruce, red pine.
						Black oak----------	70	
						Virginia pine-------	70	
BtB, BvB---- Brinkerton	2w	Slight	Severe	Severe	Moderate	Northern red oak----	77	Eastern white pine, white spruce, Japanese larch, yellow-poplar.
						Sugar maple---------	75	
						Black cherry--------	65	
CaA, CaB---- Cavode	2w	Slight	Moderate	Moderate	Moderate	Northern red oak----	80	Eastern white pine, yellow-poplar, black cherry, Norway spruce, white spruce.
						Yellow-poplar-------	90	
CaC---- Cavode	2w	Moderate	Moderate	Moderate	Moderate	Northern red oak----	80	Eastern white pine, yellow-poplar, black cherry, Norway spruce, white spruce.
						Yellow-poplar-------	90	

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	
CbB---------- Cavode	2w	Slight	Moderate	Moderate	Moderate	Northern red oak---- Yellow-poplar-------	80 90	Eastern white pine, yellow-poplar, black cherry, Norway spruce, white spruce.
CeA*, CeB*: Cookport----------	2w	Slight	Moderate	Slight	Slight	Northern red oak---- Black cherry-------- Yellow-poplar------- White ash---------- Sugar maple---------	76 80 92 80 75	Yellow-poplar, eastern white pine, black cherry, Japanese larch, Norway spruce.
Ernest----------	2w	Slight	Moderate	Slight	Slight	Northern red oak---- Yellow-poplar-------	80 90	Eastern white pine, Norway spruce.
CeC*: Cookport----------	2w	Slight	Moderate	Slight	Slight	Northern red oak---- Black cherry-------- Yellow-poplar------- White ash---------- Sugar maple---------	76 80 92 80 75	Yellow-poplar, eastern white pine, black cherry, Japanese larch, Norway spruce.
Ernest----------	2w	Moderate	Moderate	Slight	Slight	White ash---------- Black walnut--------	83 85	Eastern white pine, Norway spruce.
CeD*: Cookport----------	2w	Moderate	Moderate	Slight	Slight	Northern red oak---- Black cherry-------- Yellow-poplar------- White ash---------- Sugar maple---------	76 80 92 80 75	Yellow-poplar, eastern white pine, black cherry, Japanese larch, Norway spruce.
Ernest----------	2w	Severe	Moderate	Slight	Slight	White ash---------- Black walnut--------	83 85	Eastern white pine Norway spruce, white spruce.
CvB*: Cookport----------	2w	Slight	Moderate	Slight	Slight	Northern red oak---- Black cherry-------- Yellow-poplar------- White ash---------- Sugar maple---------	76 80 92 80 75	Yellow-poplar, eastern white pine, Japanese larch, Norway spruce.
Ernest----------	2w	Moderate	Moderate	Slight	Slight	Northern red oak---- Yellow-poplar------- White ash---------- Black walnut--------	80 90 83 85	Eastern white pine, Norway spruce.
CvD*: Cookport----------	2w	Moderate	Moderate	Slight	Slight	Northern red oak---- Black cherry-------- Yellow-poplar------- White ash---------- Sugar maple---------	76 80 92 86 75	Yellow-poplar, eastern white pine, Japanese larch, Norway spruce.
Ernest----------	2w	Severe	Moderate	Slight	Slight	Northern red oak---- Yellow-poplar------- White ash---------- Black walnut--------	80 90 83 85	Eastern white pine, Norway spruce.
GnB, GpB---------- Gilpin	2o	Slight	Slight	Slight	Slight	Northern red oak---- Yellow-poplar-------	75 95	Japanese larch, Virginia pine, eastern white pine, black cherry, yellow-poplar.

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	
GpD---------- Gilpin	2r	Moderate	Moderate	Slight	Slight	Northern red oak----	80	Japanese larch, Virginia pine, eastern white pine, black cherry, yellow-poplar.
						Yellow-poplar-------	95	
GtC*:								
Gilpin----------	2o	Slight	Slight	Slight	Slight	Northern red oak----	80	Japanese larch, Virginia pine, eastern white pine, black cherry, yellow-poplar.
						Yellow-poplar-------	95	
Rayne----------	2o	Slight	Slight	Slight	Slight	Northern red oak----	80	Eastern white pine, yellow-poplar, black cherry, Virginia pine, Norway spruce.
						Yellow-poplar-------	90	
						Eastern white pine--	90	
						Virginia pine-------	75	
GtD*:								
Gilpin----------	2r	Moderate	Moderate	Slight	Slight	Northern red oak----	80	Japanese larch, Virginia pine, eastern white pine, black cherry, yellow-poplar.
						Yellow-poplar-------	95	
Rayne----------	2r	Moderate	Moderate	Slight	Slight	Northern red oak----	80	Eastern white pine, yellow-poplar, black cherry, Virginia pine, Norway spruce.
						Yellow-poplar-------	90	
						Eastern white pine--	90	
						Virginia pine-------	75	
GwB*, GwC*:								
Gilpin----------	2o	Slight	Slight	Slight	Slight	Northern red oak----	80	Japanese larch, Virginia pine, eastern white pine, black cherry, yellow-poplar.
						Yellow-poplar-------	95	
Weikert----------	4d	Slight	Slight	Severe	Moderate	Northern red oak----	59	Virginia pine, red pine, eastern white pine. pine.
						Virginia pine-------	56	
GwD*:								
Gilpin----------	2r	Moderate	Moderate	Slight	Slight	Northern red oak----	80	Japanese larch, Virginia pine, eastern white pine, black cherry, yellow-poplar.
						Yellow-poplar-------	95	
Weikert----------	4d	Slight	Moderate	Severe	Moderate	Northern red oak----	59	Eastern white pine, Virginia pine.
						Virginia pine-------	56	
GWF*:								
Gilpin----------	2r	Severe	Severe	Slight	Slight	Northern red oak----	80	Japanese larch, Virginia pine, eastern white pine, black cherry, yellow-poplar.
						Yellow-poplar-------	95	
Weikert----------	4d	Moderate	Severe	Severe	Moderate	Northern red oak----	59	Eastern white pine, Virginia pine.
						Virginia pine-------	56	

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	
HaB, HaC---------- Hazleton	3o	Slight	Slight	Slight	Slight	Northern red oak----	70	Japanese larch, eastern white pine, Norway spruce, Austrian pine, black cherry.
						Yellow-poplar-------	80	
HaD---------- Hazleton	3r	Slight	Moderate	Slight	Slight	Northern red oak----	70	Japanese larch, eastern white pine, Norway spruce, Austrian pine, black cherry.
						Yellow-poplar-------	80	
HbB---------- Hazleton	3o	Slight	Slight	Slight	Slight	Northern red oak----	70	Japanese larch, eastern white pine, Norway spruce, Austrian pine, black cherry.
						Yellow-poplar-------	80	
HbD---------- Hazleton	3r	Slight	Moderate	Slight	Slight	Northern red oak----	70	Japanese larch, eastern white pine, Norway spruce, Austrian pine, black cherry.
						Yellow-poplar-------	80	
Hx---------- Hazleton	3x	Slight	Moderate	Slight	Slight	Northern red oak----	70	Japanese larch, eastern white pine, Norway spruce, Austrian pine, black cherry.
						Yellow-poplar-------	80	
LaB, LaC---------- Laidig	2o	Slight	Slight	Slight	Slight	Northern red oak----	80	Eastern white pine, yellow-poplar, black walnut, Norway spruce, black locust.
						Yellow-poplar-------	90	
						Eastern white pine--	90	
						White ash-----------	80	
						White oak-----------	80	
						Sugar maple---------	75	
						Black cherry--------	80	
						Black locust--------	80	
LDF*---------- Laidig	2r	Moderate	Severe	Slight	Slight	Northern red oak----	80	Eastern white pine, yellow-poplar, black walnut, Norway spruce, black locust.
						White oak-----------	80	
						Yellow-poplar-------	90	
						White ash-----------	80	
						Sugar maple---------	80	
						Black cherry--------	80	
						Eastern white pine--	90	
						Black locust--------	80	
LkB, LkC---------- Leck Kill	3o	Slight	Slight	Slight	Slight	Northern red oak----	68	Eastern white pine, Virginia pine.
LkD---------- Leck Kill	3r	Slight	Moderate	Slight	Slight	Northern red oak----	68	Eastern white pine, Virginia pine.
LtB---------- Leetonia	5f	Slight	Slight	Severe	Slight	Northern red oak----	50	Virginia pine, pitch pine.
						Virginia pine-------	60	
NoB---------- Nolo	3w	Slight	Severe	Severe	Moderate	Northern red oak----	70	Eastern white pine, Norway spruce, red maple.
						Black cherry--------	70	
Ph---------- Philo	1w	Slight	Moderate	Slight	Slight	Virginia pine-------	80	Eastern white pine, yellow-poplar, white spruce, Japanese larch.
						Northern red oak----	85	
						Yellow-poplar-------	102	
						Sugar maple---------	75	

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	
Po Pope	2o	Slight	Slight	Slight	Slight	Northern red oak Yellow-poplar Eastern white pine Virginia pine	80 102 89 74	Eastern white pine, yellow-poplar, black walnut, black cherry, Norway spruce, Japanese larch, European larch.
RaB, RaC Rayne	2o	Slight	Slight	Slight	Slight	Northern red oak Yellow-poplar Eastern white pine Virginia pine	80 90 90 75	Eastern white pine, yellow-poplar, black cherry, Virginia pine, Norway spruce.
RaD Rayne	2r	Moderate	Moderate	Slight	Slight	Northern red oak Yellow-poplar Eastern white pine Virginia pine Shortleaf pine	80 90 90 75 75	Eastern white pine, yellow-poplar, black cherry, Virginia pine, Norway spruce.
WaB Wharton	2o	Slight	Slight	Slight	Slight	Northern red oak Yellow-poplar	80 90	Eastern white pine, yellow-poplar.
WaC Wharton	2r	Moderate	Slight	Slight	Slight	Northern red oak Yellow-poplar	80 90	Eastern white pine, yellow-poplar.
WgC*:								
Wharton	2r	Moderate	Slight	Slight	Slight	Northern red oak Yellow-poplar	80 90	Eastern white pine, yellow-poplar.
Gilpin	2o	Slight	Slight	Slight	Slight	Northern red oak Yellow-poplar	80 95	Japanese larch, Virginia pine, eastern white pine, black cherry, yellow-poplar.
WgD*:								
Wharton	2r	Severe	Moderate	Slight	Slight	Northern red oak Yellow-poplar	80 90	Eastern white pine, yellow-poplar.
Gilpin	2r	Moderate	Moderate	Slight	Slight	Northern red oak Yellow-poplar	80 95	Japanese larch, Virginia pine, eastern white pine, black cherry, yellow-poplar.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 8.--BUILDING SITE DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
AbB--- Albrights	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Moderate: wetness, frost action.	Moderate: wetness.
AbC--- Albrights	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: slope, wetness.	Moderate: wetness, slope.	Moderate: slope, wetness.
AmB--- Armagh	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness, frost action.	Severe: wetness.
At--- Atkins	Severe: floods, wetness.	Severe: floods, wetness, frost action.	Severe: floods, wetness.	Severe: floods, wetness, frost action.	Severe: floods, wetness, frost action.	Severe: wetness, floods.
BeB--- Berks	Moderate: depth to rock.	Slight---	Moderate: depth to rock.	Moderate: slope.	Slight---	Severe: small stones.
BeC--- Berks	Moderate: slope, depth to rock.	Moderate: slope.	Moderate: slope, depth to rock.	Severe: slope.	Moderate: slope.	Severe: small stones.
BeD--- Berks	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, small stones.
BmB--- Blairton	Severe: wetness.	Severe: frost action, wetness.	Severe: wetness.	Severe: frost action, wetness.	Severe: frost action.	Moderate: depth to rock, wetness.
BmC--- Blairton	Severe: wetness.	Severe: frost action, wetness.	Severe: wetness.	Severe: slope, frost action, wetness.	Severe: frost action.	Moderate: slope, depth to rock, wetness.
BnB--- Blairton	Severe: wetness. frost action. wetness.	Severe: wetness, frost action.	Severe: wetness.	Severe: wetness.	Severe: frost action.	Moderate: large stones, depth to rock, wetness.
BpC*: Blairton---	Severe: wetness.	Severe: frost action, wetness.	Severe: wetness.	Severe: slope, frost action, wetness.	Severe: frost action.	Moderate: slope, depth to rock, wetness.
Berks---	Moderate: slope, depth to rock.	Moderate: slope.	Moderate: slope, depth to rock.	Severe: slope.	Moderate: slope.	Severe: small stones.
BtB, BvB--- Brinkerton	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness, frost action.	Severe: wetness.
CaA, CaB--- Cavode	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness.	Severe: wetness, frost action.	Severe: frost action.	Moderate: wetness.
CaC--- Cavode	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness.	Severe: slope, wetness, frost action.	Severe: frost action.	Moderate: slope, wetness.
CbB--- Cavode	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness.	Severe: wetness, frost action.	Severe: frost action.	Moderate: large stones, wetness.

See footnote at end of table.

TABLE 8.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
CeA*:						
Cookport	Severe: wetness.	Moderate: wetness, frost action.	Severe: wetness.	Moderate: wetness, frost action.	Moderate: frost action, low strength.	Moderate: small stones.
Ernest	Severe: wetness.	Moderate: wetness, low strength, frost action.	Severe: wetness.	Moderate: wetness, low strength, frost action.	Moderate: low strength, frost action.	Slight.
CeB*:						
Cookport	Severe: wetness.	Moderate: wetness, frost action.	Severe: wetness.	Moderate: slope, wetness, frost action.	Moderate: frost action, low strength.	Moderate: small stones.
Ernest	Severe: wetness.	Moderate: wetness, low strength, frost action.	Severe: wetness.	Moderate: slope, wetness, frost action.	Moderate: low strength, frost action.	Slight.
CeC*:						
Cookport	Severe: wetness.	Moderate: slope, wetness, frost action.	Severe: wetness.	Severe: slope.	Moderate: slope, low strength.	Moderate: slope, small stones.
Ernest	Severe: wetness.	Moderate: slope, wetness, frost action.	Severe: wetness.	Severe: slope.	Moderate: slope, frost action.	Moderate: slope.
CeD*:						
Cookport	Severe: slope, wetness.	Severe: slope.	Severe: slope, wetness.	Severe: slope.	Severe: slope.	Severe: slope.
Ernest	Severe: slope, wetness.	Severe: slope.	Severe: slope, wetness.	Severe: slope.	Severe: slope.	Severe: slope.
CvB*:						
Cookport	Severe: wetness.	Moderate: large stones, wetness, frost action.	Severe: wetness.	Moderate: slope, large stones, wetness.	Moderate: large stones, frost action.	Moderate: large stones.
Ernest	Severe: wetness.	Moderate: wetness, large stones, frost action.	Severe: wetness.	Moderate: slope, wetness, large stones.	Moderate: large stones.	Moderate: large stones.
CvD*:						
Cookport	Severe: slope, wetness.	Severe: slope.	Severe: slope, wetness.	Severe: slope.	Severe: slope.	Severe: slope.
Ernest	Severe: slope, wetness.	Severe: slope.	Severe: slope, wetness.	Severe: slope.	Severe: slope.	Severe: slope.
Dp*, Du*. Dumps						
GnB Gilpin	Moderate: depth to rock.	Moderate: frost action.	Moderate: depth to rock.	Moderate: slope, frost action.	Moderate: frost action.	Moderate: depth to rock.

See footnote at end of table.

TABLE 8.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
GpB---------- Gilpin	Moderate: depth to rock, large stones.	Moderate: large stones, frost action.	Moderate: depth to rock, large stones.	Moderate: slope, large stones, frost action.	Moderate: frost action.	Moderate: depth to rock, large stones.
GpD---------- Gilpin	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
GtC*:						
Gilpin----------	Moderate: slope, depth to rock.	Moderate: slope, frost action.	Moderate: slope, depth to rock.	Severe: slope.	Moderate: slope, frost action.	Moderate: slope, depth to rock.
Rayne----------	Moderate: slope.	Moderate: slope, frost action.	Moderate: slope.	Severe: slope.	Moderate: slope, frost action, low strength.	Moderate: slope.
GtD*:						
Gilpin----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Rayne----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
GwB*:						
Gilpin----------	Moderate: depth to rock.	Moderate: frost action.	Moderate: depth to rock.	Moderate: slope, frost action.	Moderate: frost action.	Moderate: depth to rock, small stones.
Weikert----------	Moderate: depth to rock.	Moderate: depth to rock, frost action.	Moderate: depth to rock.	Moderate: slope, depth to rock, frost action.	Moderate: depth to rock, frost action.	Moderate: small stones, droughty.
GwC*:						
Gilpin----------	Moderate: slope, depth to rock.	Moderate: slope, frost action.	Moderate: slope, depth to rock.	Severe: slope.	Moderate: slope, frost action.	Moderate: slope, depth to rock, small stones.
Weikert----------	Moderate: depth to rock, slope.	Moderate: slope, depth to rock, frost action.	Moderate: depth to rock, slope.	Severe: slope.	Moderate: slope, depth to rock, frost action.	Moderate: slope, small stones, droughty.
GwD*, GWF*:						
Gilpin----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Weikert----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
HaB---------- Hazleton	Moderate: small stones.	Moderate: frost action.	Slight---------	Moderate: slope, frost action.	Moderate: frost action.	Moderate: small stones.
HaC---------- Hazleton	Moderate: slope, small stones.	Moderate: slope, frost action.	Moderate: slope.	Severe: slope.	Moderate: slope, frost action.	Moderate: slope, small stones.
HaD---------- Hazleton	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
HbB---------- Hazleton	Moderate: large stones.	Moderate: large stones, frost action.	Moderate: large stones.	Moderate: slope, large stones.	Moderate: frost action.	Moderate: large stones.

See footnote at end of table.

TABLE 8.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
HbD--Hazleton	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Hx--Hazleton	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope.	Severe: slope, large stones.
LaB--Laidig	Moderate: wetness.	Moderate: frost action.	Moderate: wetness.	Moderate: slope, frost action.	Moderate: frost action.	Slight.
LaC--Laidig	Moderate: slope, wetness.	Moderate: slope, frost action.	Moderate: slope, wetness.	Severe: slope.	Moderate: slope, frost action.	Moderate: slope.
LDF*--Laidig	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
LkB--Leck Kill	Slight---	Moderate: frost action.	Slight---	Moderate: slope, frost action.	Moderate: frost action.	Slight.
LkC--Leck Kill	Moderate: slope.	Moderate: slope, frost action.	Moderate: slope.	Severe: slope.	Moderate: slope, frost action.	Moderate: slope.
LkD--Leck Kill	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
LtB--Leetonia	Severe: cutbanks cave.	Moderate: large stones.	Moderate: large stones.	Moderate: large stones.	Moderate: large stones.	Severe: too sandy.
NoB--Nolo	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness, frost action.	Severe: wetness.
Ph--Philo	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods.	Moderate: floods.
Po--Pope	Severe: floods.	Severe: floods.	Severe: floods.	Severe: floods.	Severe: floods.	Moderate: floods.
RaB--Rayne	Slight---	Moderate: frost action.	Slight---	Moderate: slope, frost action.	Moderate: frost action, low strength.	Slight.
RaC--Rayne	Moderate: slope.	Moderate: slope, frost action.	Moderate: slope.	Severe: slope.	Moderate: slope, frost action, low strength.	Moderate: slope.
RaD--Rayne	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
UDC*, UDF*. Udorthents						
URB*, URC*: Urban land.						
Udorthents.						
WaB--Wharton	Severe: wetness.	Severe: frost action.	Severe: wetness.	Severe: frost action.	Severe: frost action, low strength.	Slight.

See footnote at end of table.

TABLE 8.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
WaC---------- Wharton	Severe: wetness.	Severe: frost action.	Severe: wetness.	Severe: slope, frost action.	Severe: frost action, low strength.	Moderate: slope.
WgC*: Wharton----------	Severe: wetness.	Severe: frost action.	Severe: wetness.	Severe: slope, frost action.	Severe: frost action, low strength.	Moderate: slope.
Gilpin----------	Moderate: slope, depth to rock.	Moderate: slope, frost action.	Moderate: slope, depth to rock.	Severe: slope.	Moderate: slope, frost action.	Moderate: slope, depth to rock.
WgD*: Wharton----------	Severe: slope, wetness.	Severe: slope, frost action.	Severe: slope, wetness.	Severe: slope, frost action.	Severe: slope, frost action, low strength.	Severe: slope.
Gilpin----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 9.--SANITARY FACILITIES

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
AbB Albrights	Severe: wetness, percs slowly.	Moderate: slope.	Severe: wetness.	Severe: wetness.	Fair: small stones.
AbC Albrights	Severe: wetness, percs slowly.	Severe: slope.	Severe: wetness.	Severe: wetness.	Fair: slope, small stones.
AmB Armagh	Severe: percs slowly, wetness.	Moderate: slope, depth to rock.	Severe: wetness, depth to rock.	Severe: wetness.	Poor: wetness.
At Atkins	Severe: floods, wetness, percs slowly.	Severe: floods, wetness, seepage.	Severe: floods, wetness, seepage.	Severe: floods, wetness, seepage.	Poor: wetness.
BeB Berks	Severe: depth to rock.	Severe: seepage, depth to rock.	Severe: depth to rock, seepage.	Severe: seepage.	Poor: small stones.
BeC Berks	Severe: depth to rock.	Severe: slope, seepage, depth to rock.	Severe: depth to rock, seepage.	Severe: seepage.	Poor: small stones.
BeD Berks	Severe: slope, depth to rock.	Severe: slope, seepage, depth to rock.	Severe: depth to rock, seepage.	Severe: slope, seepage.	Poor: slope, small stones.
BmB Blairton	Severe: wetness, percs slowly, depth to rock.	Severe: depth to rock, wetness.	Severe: wetness, depth to rock.	Severe: wetness.	Fair: thin layer.
BmC Blairton	Severe: wetness, percs slowly, depth to rock.	Severe: slope, depth to rock, wetness.	Severe: wetness, depth to rock.	Severe: wetness.	Fair: slope, thin layer.
BnB Blairton	Severe: wetness, percs slowly, depth to rock.	Severe: depth to rock, wetness.	Severe: wetness, depth to rock.	Severe: wetness.	Fair: thin layer, large stones.
BpC*: Blairton	Severe: wetness, percs slowly, depth to rock.	Severe: slope, depth to rock, wetness.	Severe: wetness, depth to rock.	Severe: wetness.	Fair: slope, thin layer.
Berks	Severe: depth to rock.	Severe: slope, seepage, depth to rock.	Severe: depth to rock, seepage.	Severe: seepage.	Poor: small stones.
BtB Brinkerton	Severe: wetness, percs slowly.	Moderate: slope.	Severe: wetness.	Severe: wetness.	Poor: wetness.

See footnote at end of table.

TABLE 9.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
BvB---------- Brinkerton	Severe: wetness, percs slowly.	Moderate: slope, large stones.	Severe: wetness.	Severe: wetness.	Poor: wetness.
CaA---------- Cavode	Severe: percs slowly, wetness.	Moderate: depth to rock.	Severe: wetness, depth to rock.	Severe: wetness.	Fair: too clayey, thin layer.
CaB---------- Cavode	Severe: percs slowly, wetness.	Moderate: slope, depth to rock.	Severe: wetness, depth to rock.	Severe: wetness.	Fair: too clayey, thin layer.
CaC---------- Cavode	Severe: percs slowly, wetness.	Severe: slope.	Severe: wetness, depth to rock.	Severe: wetness.	Fair: too clayey, thin layer.
CbB---------- Cavode	Severe: percs slowly, wetness.	Moderate: slope, depth to rock.	Severe: wetness, depth to rock.	Severe: wetness.	Fair: too clayey, thin layer.
CeA*: Cookport----------	Severe: wetness, percs slowly.	Moderate: depth to rock.	Severe: wetness, depth to rock.	Severe: wetness.	Fair: small stones, thin layer.
Ernest----------	Severe: percs slowly, wetness.	Slight----------	Severe: wetness.	Severe: wetness.	Fair: thin layer.
CeB*: Cookport----------	Severe: wetness, percs slowly.	Moderate: slope, depth to rock.	Severe: wetness, depth to rock.	Severe: wetness.	Fair: small stones, thin layer.
Ernest----------	Severe: percs slowly, wetness.	Moderate: slope.	Severe: wetness.	Severe: wetness.	Fair: thin layer.
CeC*: Cookport----------	Severe: wetness, percs slowly.	Severe: slope.	Severe: wetness, depth to rock.	Severe: wetness.	Fair: slope, small stones.
Ernest----------	Severe: percs slowly, wetness.	Severe: slope.	Severe: wetness.	Severe: wetness.	Fair: slope, thin layer.
CeD*: Cookport----------	Severe: slope, wetness, percs slowly.	Severe: slope.	Severe: wetness, depth to rock.	Severe: slope, wetness.	Poor: slope.
Ernest----------	Severe: slope, percs slowly, wetness.	Severe: slope.	Severe: wetness.	Severe: wetness.	Poor: slope.
CvB*: Cookport----------	Severe: wetness, percs slowly.	Moderate: slope, depth to rock, large stones.	Severe: wetness, depth to rock.	Severe: wetness.	Fair: large stones, thin layer.

See footnote at end of table.

TABLE 9.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
CvB*: Ernest	Severe: percs slowly, wetness.	Moderate: slope, large stones.	Severe: wetness.	Severe: wetness.	Fair: thin layer, large stones.
CvD*: Cookport	Severe: slope, wetness, percs slowly.	Severe: slope.	Severe: wetness, depth to rock.	Severe: slope.	Poor: slope.
Ernest	Severe: slope, percs slowly, wetness.	Severe: slope.	Severe: wetness.	Severe: slope.	Poor: slope.
Dp*, Du*. Dumps					
GnB Gilpin	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Slight	Fair: thin layer.
GpB Gilpin	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Slight	Fair: thin layer, large stones.
GpD Gilpin	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Poor: slope.
GtC*: Gilpin	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Moderate: slope.	Fair: thin layer.
Rayne	Moderate: slope, depth to rock.	Severe: slope.	Severe: depth to rock.	Moderate: slope.	Fair: slope, thin layer, small stones.
GtD*: Gilpin	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: slope.	Poor: slope.
Rayne	Severe: slope.	Severe: slope.	Severe: depth to rock.	Severe: slope.	Poor: slope.
GwB*: Gilpin	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Slight	Fair: small stones, thin layer.
Weikert	Severe: depth to rock.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Severe: seepage.	Poor: thin layer.
GwC*: Gilpin	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Moderate: slope.	Fair: small stones, slope, thin layer.
Weikert	Severe: depth to rock.	Severe: slope, depth to rock, seepage.	Severe: depth to rock, seepage.	Severe: seepage.	Poor: thin layer.

See footnote at end of table.

TABLE 9.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
GwD*:					
Gilpin	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: slope.	Poor: slope.
Weikert	Severe: slope, depth to rock.	Severe: slope, depth to rock, seepage.	Severe: depth to rock, seepage.	Severe: slope, seepage.	Poor: slope, thin layer.
GWF*:					
Gilpin	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: slope.	Poor: slope.
Weikert	Severe: slope, depth to rock.	Severe: slope, depth to rock, seepage.	Severe: slope, depth to rock, seepage.	Severe: slope, seepage.	Poor: slope, thin layer.
HaB Hazleton	Moderate: depth to rock.	Severe: seepage.	Severe: seepage.	Severe: seepage.	Moderate: small stones, depth to rock.
HaC Hazleton	Moderate: slope, depth to rock.	Severe: slope, seepage.	Severe: seepage.	Severe: seepage.	Moderate: slope, small stones, depth to rock.
HaD Hazleton	Severe: slope.	Severe: slope, seepage.	Severe: seepage.	Severe: slope, seepage.	Poor: slope.
HbB Hazleton	Moderate: depth to rock.	Severe: seepage.	Severe: seepage.	Severe: seepage.	Moderate: small stones, depth to rock.
HbD Hazleton	Severe: slope.	Severe: slope, seepage.	Severe: seepage.	Severe: slope, seepage.	Poor: slope.
Hx Hazleton	Severe: slope.	Severe: slope, seepage, large stones.	Severe: slope, seepage, large stones.	Severe: slope, seepage.	Poor: slope, small stones.
LaB Laidig	Severe: percs slowly, wetness.	Moderate: slope, seepage.	Severe: wetness.	Moderate: wetness.	Fair: small stones.
LaC Laidig	Severe: percs slowly, wetness.	Severe: slope.	Severe: wetness.	Moderate: slope, wetness.	Fair: slope, small stones.
LDF* Laidig	Severe: slope, percs slowly, wetness.	Severe: slope.	Severe: slope, wetness.	Severe: slope.	Poor: slope.
LkB Leck Kill	Moderate: depth to rock.	Severe: seepage.	Severe: depth to rock, seepage.	Severe: seepage.	Fair: thin layer, small stones.
LkC Leck Kill	Moderate: slope, depth to rock.	Severe: slope, seepage.	Severe: depth to rock, seepage.	Severe: seepage.	Fair: slope, thin layer, small stones.

See footnote at end of table.

TABLE 9.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
LkD---------- Leck Kill	Severe: slope.	Severe: slope, seepage.	Severe: depth to rock, seepage.	Severe: slope, seepage.	Poor: slope.
LtB---------- Leetonia	Moderate: large stones.	Severe: seepage.	Severe: depth to rock, seepage.	Severe: seepage.	Poor: large stones.
NoB---------- Nolo	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness, depth to rock.	Severe: wetness.	Poor: wetness.
Ph---------- Philo	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, seepage, wetness.	Severe: floods, wetness, seepage.	Good.
Po---------- Pope	Severe: floods.	Severe: floods, seepage.	Severe: floods, seepage.	Severe: floods, seepage.	Good.
RaB---------- Rayne	Moderate: depth to rock.	Moderate: slope, depth to rock, seepage.	Severe: depth to rock.	Slight----------	Fair: thin layer, small stones.
RaC---------- Rayne	Moderate: slope, depth to rock.	Severe: slope.	Severe: depth to rock.	Moderate: slope.	Fair: slope, thin layer, small stones.
RaD---------- Rayne	Severe: slope.	Severe: slope.	Severe: depth to rock.	Severe: slope.	Poor: slope.
UDC*, UDF*. Udorthents					
URB*, URC*: Urban land.					
Udorthents.					
WaB---------- Wharton	Severe: percs slowly, wetness.	Moderate: slope.	Severe: wetness.	Severe: wetness.	Fair: too clayey.
WaC---------- Wharton	Severe: percs slowly, wetness.	Severe: slope.	Severe: wetness.	Severe: wetness.	Fair: slope, too clayey.
WgC*: Wharton----------	Severe: percs slowly, wetness.	Severe: slope.	Severe: wetness.	Severe: wetness.	Fair: slope, too clayey.
Gilpin----------	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Moderate: slope.	Fair: thin layer.
WgD*: Wharton----------	Severe: slope, percs slowly, wetness.	Severe: slope.	Severe: wetness.	Severe: slope.	Poor: slope.

See footnote at end of table.

TABLE 9.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
WgD*: Gilpin	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: slope.	Poor: slope.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 10.--CONSTRUCTION MATERIALS

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," and "poor." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
AbB---------- Albrights	Fair: frost action, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: small stones.
AbC---------- Albrights	Fair: frost action, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: slope, small stones.
AmB---------- Armagh	Poor: wetness, frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: wetness.
At---------- Atkins	Poor: wetness, frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: wetness.
BeB, BeC---------- Berks	Poor: thin layer.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: small stones.
BeD---------- Berks	Poor: thin layer.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope, small stones.
BmB---------- Blairton	Poor: frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: small stones, thin layer.
BmC---------- Blairton	Poor: frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: slope, small stones.
BnB---------- Blairton	Poor: frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: large stones.
BpC*:				
Blairton----------	Poor: frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: small stones.
Berks----------	Poor: thin layer.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: small stones.
BtB, BvB---------- Brinkerton	Poor: wetness, frost action, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: wetness.
CaA, CaB---------- Cavode	Poor: frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer.
CaC---------- Cavode	Poor: frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: slope, thin layer.
CbB---------- Cavode	Poor: frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: large stones.
CeA*, CeB*:				
Cookport----------	Fair: frost action, low strength, thin layer.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: small stones.

See footnote at end of table.

TABLE 10.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
CeA*, CeB*:				
Ernest	Fair: low strength, frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer, small stones.
CeC*:				
Cookport	Fair: frost action, low strength, thin layer.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: small stones.
Ernest	Fair: low strength, frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: slope, thin layer.
CeD*:				
Cookport	Fair: slope, low strength, thin layer.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope, small stones.
Ernest	Fair: slope, low strength, frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope.
CvB*:				
Cookport	Fair: frost action, low strength, thin layer.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: large stones.
Ernest	Fair: low strength, frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: large stones.
CvD*:				
Cookport	Fair: slope, low strength, thin layer.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope, large stones.
Ernest	Fair: slope, low strength, frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope, large stones.
Dp*, Du*. Dumps				
GnB Gilpin	Poor: thin layer.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer, small stones.
GpB Gilpin	Poor: thin layer.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: large stones.
GpD Gilpin	Poor: thin layer.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope, large stones.
GtC*:				
Gilpin	Poor: thin layer.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: slope, thin layer, small stones.

See footnote at end of table.

TABLE 10.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
GtC*:				
Rayne	Fair: frost action, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: slope, thin layer.
GtD*:				
Gilpin	Poor: thin layer.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope.
Rayne	Fair: slope, frost action, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope.
GwB*, GwC*:				
Gilpin	Poor: thin layer.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: small stones.
Weikert	Poor: depth to rock.	Unsuited: excess fines.	Poor: excess fines.	Poor: small stones, thin layer.
GwD*:				
Gilpin	Poor: thin layer.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope.
Weikert	Poor: depth to rock.	Unsuited: excess fines.	Poor: excess fines.	Poor: slope, small stones, thin layer.
GWF*:				
Gilpin	Poor: thin layer, slope.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope.
Weikert	Poor: slope, depth to rock.	Unsuited: excess fines.	Poor: excess fines.	Poor: slope, small stones, thin layer.
HaB, HaC	Fair: frost action.	Poor: excess fines.	Poor: excess fines.	Poor: small stones.
Hazleton				
HaD	Fair: slope, frost action.	Poor: excess fines.	Poor: excess fines.	Poor: slope, small stones.
Hazleton				
HbB	Fair: frost action.	Poor: excess fines, large stones.	Poor: excess fines, large stones.	Poor: large stones, small stones.
Hazleton				
HbD	Fair: slope, frost action.	Poor: excess fines, large stones.	Poor: excess fines, large stones.	Poor: slope, large stones, small stones.
Hazleton				
Hx	Poor: slope.	Unsuited: large stones.	Unsuited: large stones.	Poor: slope, large stones, small stones.
Hazleton				
LaB, LaC	Fair: frost action, wetness.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: small stones.
Laidig				

See footnote at end of table.

TABLE 10.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
LDF* Laidig	Poor: slope.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope, large stones.
LkB Leck Kill	Fair: frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer.
LkC Leck Kill	Fair: frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: slope, thin layer.
LkD Leck Kill	Fair: frost action, slope.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope.
LtB Leetonia	Fair: area reclaim, large stones.	Fair: excess fines, large stones.	Fair: excess fines, large stones.	Poor: large stones, too sandy.
NoB Nolo	Poor: wetness, frost action, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: wetness, large stones.
Ph Philo	Fair: low strength, frost action.	Poor: excess fines.	Unsuited: excess fines.	Good.
Po Pope	Fair: low strength.	Poor: excess fines.	Poor: excess fines.	Good.
RaB Rayne	Fair: frost action, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer.
RaC Rayne	Fair: frost action, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: slope, thin layer.
RaD Rayne	Fair: slope, frost action, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope.
UDC*, UDF*. Udorthents				
URB*, URC*: Urban land.				
Udorthents.				
WaB Wharton	Poor: low strength, frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer.
WaC Wharton	Poor: low strength, frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: slope, thin layer.
WgC*: Wharton	Poor: low strength, frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: slope, thin layer.

See footnote at end of table.

TABLE 10.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
WgC*:				
Gilpin	Poor: thin layer.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: slope, thin layer, small stones.
WgD*:				
Wharton	Poor: low strength, frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope.
Gilpin	Poor: thin layer.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 11.--WATER MANAGEMENT

[Some terms that describe restrictive soil features are defined in the Glossary. Absence of an entry indicates that the soil was not evaluated]

Soil name and map symbol	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Terraces and diversions	Grassed waterways
AbB, AbC---------- Albrights	Slope----------	Piping, low strength.	Deep to water	Percs slowly, wetness.	Slope, percs slowly.	Percs slowly, wetness.
AmB---------- Armagh	Favorable------	Low strength---	Favorable------	Wetness, percs slowly.	Not needed-----	Wetness, percs slowly.
At---------- Atkins	Seepage, wetness.	Piping, floods.	Favorable------	Floods, wetness.	Not needed-----	Wetness, floods.
BeB, BeC, BeD----- Berks	Depth to rock, seepage.	Seepage, thin layer, piping.	No water-------	Not needed-----	Depth to rock, slope, small stones.	Depth to rock, droughty, slope.
BmB, BmC---------- Blairton	Depth to rock	Piping---------	Slow refill----	Depth to rock, percs slowly, wetness.	Depth to rock, percs slowly, wetness.	Rooting depth, percs slowly, wetness.
BnB---------- Blairton	Depth to rock	Piping, large stones.	Slow refill, large stones.	Depth to rock, percs slowly, wetness.	Depth to rock, large stones, wetness.	Rooting depth, large stones, wetness.
BpC*: Blairton---------	Depth to rock	Piping---------	Slow refill----	Depth to rock, percs slowly, wetness.	Depth to rock, percs slowly, wetness.	Rooting depth, percs slowly, wetness.
Berks----------	Depth to rock, seepage.	Seepage, thin layer, piping.	No water-------	Not needed-----	Depth to rock, slope, small stones.	Depth to rock, droughty, slope.
BtB, BvB---------- Brinkerton	Slope----------	Piping, low strength.	Favorable------	Wetness, percs slowly.	Percs slowly, erodes easily, wetness.	Percs slowly, wetness, erodes easily.
CaA, CaB, CaC----- Cavode	Slope, depth to rock.	Low strength---	Deep to water	Wetness, percs slowly.	Wetness, percs slowly.	Wetness, percs slowly.
CbB---------- Cavode	Slope, depth to rock.	Low strength, large stones.	Deep to water, large stones.	Wetness, percs slowly.	Wetness, percs slowly, large stones.	Wetness, percs slowly, large stones.
CeA*, CeB*, CeC*, CeD*: Cookport--------	Slope----------	Piping---------	Deep to water	Slope, percs slowly.	Slope, percs slowly, rooting depth.	Slope, percs slowly, rooting depth.
Ernest----------	Slope----------	Low strength---	Deep to water	Slope, percs slowly.	Slope, erodes easily, percs slowly.	Slope, erodes easily, percs slowly.
CvB*, CvD*: Cookport---------	Slope----------	Large stones, piping.	Deep to water	Slope, percs slowly.	Slope, percs slowly, large stones.	Slope, percs slowly, large stones.
Ernest----------	Slope----------	Large stones, low strength.	Large stones, deep to water.	Slope, percs slowly.	Slope, large stones, percs slowly.	Slope, large stones, percs slowly.
Dp*, Du*. Dumps						
GnB---------- Gilpin	Slope, depth to rock, seepage.	Thin layer-----	Deep to water	Not needed-----	Slope, depth to rock.	Slope, depth to rock.

See footnote at end of table.

TABLE 11.--WATER MANAGEMENT--Continued

Soil name and map symbol	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Terraces and diversions	Grassed waterways
GpB, GpD---------- Gilpin	Depth to rock, slope, seepage.	Thin layer, large stones.	No water-------	Not needed-----	Slope, depth to rock.	Slope, depth to rock.
GtC*, GtD*: Gilpin----------	Slope, depth to rock, seepage.	Thin layer-----	No water-------	Not needed-----	Slope, depth to rock.	Slope, depth to rock.
Rayne----------	Slope, seepage, depth to rock.	Low strength, compressible, piping.	No water-------	Not needed-----	Slope, depth to rock.	Slope.
GwB*, GwC*, GwD*, GWF*: Gilpin----------	Slope, depth to rock, seepage.	Thin layer-----	No water-------	Not needed-----	Slope, depth to rock.	Slope, depth to rock.
Weikert---------	Seepage, slope, depth to rock.	Thin layer, low strength, seepage.	No water-------	Not needed-----	Depth to rock, rooting depth.	Depth to rock, rooting depth, droughty.
HaB, HaC, HaD----- Hazleton	Slope, depth to rock, seepage.	Low strength, piping.	No water-------	Not needed-----	Slope, depth to rock.	Slope.
HbB, HbD, Hx------ Hazleton	Slope, large stones, seepage.	Low strength, piping, large stones.	No water-------	Not needed-----	Slope, large stones.	Slope, large stones.
LaB, LaC---------- Laidig	Slope, seepage.	Favorable------	No water-------	Not needed-----	Slope, rooting depth.	Slope, rooting depth.
LDF*---------- Laidig	Slope, seepage.	Slope, large stones.	No water, large stones.	Not needed-----	Slope, large stones, rooting depth.	Slope, large stones, rooting depth.
LkB, LkC, LkD----- Leck Kill	Seepage, slope.	Low strength, compressible, piping.	No water-------	Not needed-----	Slope----------	Slope.
LtB---------- Leetonia	Seepage, slope.	Seepage, piping, large stones.	No water-------	Not needed-----	Depth to rock, large stones, piping.	Droughty, large stones, slope.
NoB---------- Nolo	Slope----------	Piping, large stones.	Large stones---	Wetness, percs slowly.	Percs slowly, erodes easily, wetness.	Large stones, wetness, erodes easily.
Ph---------- Philo	Seepage--------	Piping---------	Deep to water	Floods, poor outlets.	Not needed-----	Not needed.
Po---------- Pope	Seepage--------	Piping---------	No water-------	Not needed-----	Favorable------	Favorable.
RaB, RaC, RaD----- Rayne	Slope, seepage, depth to rock.	Low strength, compressible, piping.	No water-------	Not needed-----	Slope, depth to rock.	Slope.
UDC*, UDF*. Udorthents						
URB*, URC*: Urban land.						
Udorthents.						
WaB, WaC---------- Wharton	Slope----------	Low strength, hard to pack.	Deep to water	Slope, percs slowly.	Slope, percs slowly, erodes easily.	Slope, percs slowly, erodes easily.

See footnote at end of table.

TABLE 11.--WATER MANAGEMENT--Continued

Soil name and map symbol	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Terraces and diversions	Grassed waterways
WgC*, WgD*:						
Wharton	Slope	Low strength, hard to pack.	Deep to water	Slope, percs slowly.	Slope, percs slowly, erodes easily.	Slope, percs slowly, erodes easily.
Gilpin	Slope, depth to rock, seepage.	Thin layer	No water	Not needed	Slope, depth to rock.	Slope, depth to rock.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 12.--RECREATIONAL DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
AbB---- Albrights	Moderate: wetness.	Moderate: wetness.	Moderate: slope, wetness.	Moderate: wetness.	Moderate: wetness.
AbC---- Albrights	Moderate: slope, wetness.	Moderate: slope, wetness.	Severe: slope.	Moderate: wetness.	Moderate: slope, wetness.
AmB---- Armagh	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
At---- Atkins	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.
BeB---- Berks	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Moderate: small stones.	Severe: small stones.
BeC---- Berks	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Moderate: small stones.	Severe: small stones.
BeD---- Berks	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.
BmB---- Blairton	Moderate: percs slowly, wetness,	Moderate: wetness.	Moderate: slope. wetness, depth to rock.	Moderate: wetness.	Moderate: depth to rock, wetness.
BmC---- Blairton	Moderate: slope, percs slowly, wetness.	Moderate: slope, wetness.	Severe: slope.	Moderate: wetness.	Moderate: slope, depth to rock, wetness.
BnB---- Blairton	Moderate: large stones, wetness, percs slowly.	Moderate: wetness.	Moderate: wetness, slope, depth to rock.	Moderate: wetness, large stones.	Moderate: large stones, wetness, depth to rock.
BpC*: Blairton----	Moderate: slope, wetness, percs slowly.	Moderate: slope, wetness.	Severe: slope, small stones.	Moderate: wetness, small stones.	Moderate: slope, depth to rock, wetness.
Berks----	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Moderate: small stones.	Severe: small stones.
BtB, BvB---- Brinkerton	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
CaA, CaB---- Cavode	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
CaC---- Cavode	Severe: wetness.	Moderate: slope, wetness.	Severe: slope, wetness.	Moderate: wetness.	Moderate: slope, wetness.
CbB---- Cavode	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness, large stones.	Moderate: large stones, wetness.

See footnote at end of table.

TABLE 12.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
CeA*:					
Cookport	Moderate: small stones, percs slowly.	Moderate: small stones.	Severe: small stones.	Moderate: small stones.	Moderate: small stones.
Ernest	Moderate: percs slowly, wetness.	Slight	Moderate: percs slowly, wetness.	Slight	Slight.
CeB*:					
Cookport	Moderate: small stones, percs slowly.	Moderate: small stones.	Severe: small stones.	Moderate: small stones.	Moderate: small stones.
Ernest	Moderate: percs slowly, wetness.	Slight	Moderate: slope, percs slowly.	Slight	Slight.
CeC*:					
Cookport	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope.	Moderate: small stones.	Moderate: slope, small stones.
Ernest	Moderate: slope, wetness.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
CeD*:					
Cookport	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope, small stones.	Severe: slope.
Ernest	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
CvB*:					
Cookport	Moderate: percs slowly, large stones.	Moderate: small stones.	Severe: small stones.	Moderate: large stones.	Moderate: large stones.
Ernest	Moderate: wetness, large stones.	Slight	Moderate: slope, large stones.	Moderate: large stones.	Moderate: large stones.
CvD*:					
Cookport	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope, large stones.	Severe: slope.
Ernest	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope, large stones.	Severe: slope.
Dp*, Du*. Dumps					
GnB Gilpin	Slight	Slight	Moderate: slope.	Slight	Moderate: depth to rock.
GpB Gilpin	Moderate: large stones, small stones.	Moderate: small stones.	Moderate: large stongs, slope.	Moderate: large stones, small stones.	Moderate: depth to rock, large stones.
GpD Gylpin	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: large stones, small stones, slope.	Severe: slope.

See footnote at end of table.

TABLE 12.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
GtC*:					
Gilpin	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope, depth to rock.
Rayne	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
GtD*:					
Gilpin	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
Rayne	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
GwB*:					
Gilpin	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Moderate: small stones.	Moderate: slope, depth to rock, small stones.
Weikert	Moderate: small stones.	Moderate: small stones.	Severe: depth to rock, small stones.	Moderate: small stones.	Moderate: small stones, droughty.
GwC*:					
Gilpin	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: small stones, slope.	Moderate: small stones.	Moderate: slope, depth to rock, small stones.
Weikert	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, depth to rock, small stones.	Moderate: small stones.	Moderate: slope, small stones, droughty.
GwD*:					
Gilpin	Severe: slope.	Severe: slope.	Severe: small stones, slope.	Moderate: slope, small stones.	Severe: slope.
Weikert	Severe: slope.	Severe: slope.	Severe: slope, depth to rock, small stones.	Moderate: slope, small stones.	Severe: slope.
GWF*:					
Gilpin	Severe: slope.	Severe: slope.	Severe: small stones, slope.	Severe: slope.	Severe: slope.
Weikert	Severe: slope.	Severe: slope.	Severe: slope, depth to rock, small stones.	Severe: slope.	Severe: slope.
HaB Hazleton	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Moderate: small stones.	Moderate: small stones.
HaC Hazleton	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Moderate: small stones.	Moderate: slope, small stones.
HaD Hazleton	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope, small stones.	Severe: slope.

See footnote at end of table.

TABLE 12.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
HbB---------- Hazleton	Moderate: large stones.	Moderate: small stones.	Severe: small stones.	Moderate: large stones.	Moderate: large stones.
HbD---------- Hazleton	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope, large stones.	Severe: slope.
Hx---------- Hazleton	Severe: slope, large stones.	Severe: slope.	Severe: slope, small stones, large stones.	Severe: slope, large stones.	Severe: slope, large stones.
LaB---------- Laidig	Slight----------	Slight----------	Moderate: slope.	Slight----------	Slight:
LaC---------- Laidig	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight----------	Moderate: slope.
LDF*---------- Laidig	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
LkB---------- Leck Kill	Slight----------	Slight----------	Moderate: slope.	Slight----------	Slight.
LkC---------- Leck Kill	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight----------	Moderate: slope.
LkD---------- Leck Kill	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
LtB---------- Leetonia	Moderate: large stones.	Moderate: large stones.	Severe: large stones.	Moderate: large stones.	Severe: too sandy.
NoB---------- Nolo	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Ph---------- Philo	Severe: floods.	Moderate: floods.	Moderate: floods, wetness.	Slight----------	Moderate: floods.
Po---------- Pope	Severe: floods.	Moderate: floods.	Moderate: floods.	Slight----------	Moderate: floods.
RaB---------- Rayne	Slight----------	Slight----------	Moderate: slope.	Slight----------	Slight.
RaC---------- Rayne	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight----------	Moderate: slope.
RaD---------- Rayne	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
UDC*, UDF*. Udorthents					
URB*, URC*: Urban land.					
Udorthents.					
WaB---------- Wharton	Moderate: percs slowly, wetness.	Slight----------	Moderate: slope, percs slowly, wetness.	Slight----------	Slight.

See footnote at end of table.

TABLE 12.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
WaC---------- Wharton	Moderate: slope, percs slowly, wetness.	Moderate: slope.	Severe: slope.	Slight----------	Moderate: slope.
WgC*:					
Wharton----------	Moderate: slope, percs slowly, wetness.	Moderate: slope.	Severe: slope.	Slight----------	Moderate: slope.
Gilpin----------	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight----------	Moderate: slope, depth to rock.
WgD*:					
Wharton----------	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
Gilpin----------	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 13.--WILDLIFE HABITAT POTENTIALS

[See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
AbB---- Albrights	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
AbC---- Albrights	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
AmB---- Armagh	Poor	Fair	Fair	Fair	Fair	Poor	Very poor.	Fair	Fair	Very poor.
At---- Atkins	Poor	Fair	Fair	Fair	Fair	Good	Fair	Fair	Fair	Fair.
BeB---- Berks	Poor	Fair	Fair	Poor	Poor	Poor	Very poor.	Fair	Poor	Very poor.
BeC---- Berks	Poor	Fair	Fair	Poor	Poor	Very poor.	Very poor.	Fair	Poor	Very poor.
BeD---- Berks	Poor	Fair	Fair	Poor	Poor	Very poor.	Very poor.	Fair	Poor	Very poor.
BmB---- Blairton	Fair	Fair	Good	Good	Good	Poor	Very poor.	Fair	Good	Very poor.
BmC---- Blairton	Fair	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
BnB---- Blairton	Very poor.	Poor	Good	Good	Good	Poor	Very poor.	Poor	Good	Very poor.
BpC*:										
Blairton----	Fair	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Berks----	Poor	Fair	Fair	Poor	Poor	Very poor.	Very poor.	Fair	Poor	Very poor.
BtB---- Brinkerton	Poor	Fair	Good	Fair	Fair	Poor	Very poor.	Fair	Fair	Very poor.
BvB---- Brinkerton	Very poor.	Poor	Good	Fair	Fair	Poor	Very poor.	Poor	Fair	Very poor.
CaA---- Cavode	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
CaB---- Cavode	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
CaC---- Cavode	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
CbB---- Cavode	Very poor.	Poor	Good	Good	Good	Poor	Very poor.	Poor	Good	Very poor.
CeA*:										
Cookport----	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
Ernest----	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.

See footnote at end of table.

TABLE 13.--WILDLIFE HABITAT POTENTIALS--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
CeB*:										
Cookport	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Ernest	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
CeC*:										
Cookport	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Ernest	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
CeD*:										
Cookport	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Ernest	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
CvB*:										
Cookport	Very poor.	Poor	Good	Good	Good	Poor	Very poor.	Poor	Good	Very poor.
Ernest	Very poor.	Poor	Good	Good	Good	Poor	Very poor.	Poor	Good	Very poor.
CvD*:										
Cookport	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Ernest	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Dp*, Du*. Dumps										
GnB---- Gilpin	Fair	Good	Good	Fair	Fair	Poor	Very poor.	Good	Fair	Very poor.
GpB---- Gilpin	Very poor.	Poor	Good	Fair	Fair	Poor	Very poor.	Poor	Fair	Very poor.
GpD---- Gilpin	Very poor.	Poor	Good	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
GtC*:										
Gilpin	Fair	Good	Good	Fair	Fair	Very poor.	Very poor.	Good	Fair	Very poor.
Rayne	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
GtD*:										
Gilpin	Poor	Fair	Good	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
Rayne	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
GwB*:										
Gilpin	Fair	Good	Good	Fair	Fair	Poor	Very poor.	Good	Fair	Very poor.

See footnote at end of table.

TABLE 13.--WILDLIFE HABITAT POTENTIALS--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
GwB*:										
Weikert	Very poor.	Poor	Poor	Very poor.	Very poor.	Poor	Very poor.	Poor	Very poor.	Very poor.
GwC*:										
Gilpin	Fair	Good	Good	Fair	Fair	Very poor.	Very poor.	Good	Fair	Very poor.
Weikert	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Very poor.
GwD*:										
Gilpin	Poor	Fair	Good	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
Weikert	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Very poor.
GWF*:										
Gilpin	Very poor.	Poor	Good	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
Weikert	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Very poor.
HaB---- Hazleton	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
HaC---- Hazleton	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
HaD---- Hazleton	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
HbB---- Hazleton	Very poor.	Poor	Good	Good	Good	Poor	Very poor.	Poor	Good	Very poor.
HbD---- Hazleton	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Hx---- Hazleton	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.
LaB---- Laidig	Fair	Good	Good	Fair	Fair	Poor	Very poor.	Good	Fair	Very poor.
LaC---- Laidig	Fair	Good	Good	Fair	Fair	Very poor.	Very poor.	Good	Fair	Very poor.
LDF*---- Laidig	Very poor.	Poor	Good	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
LkB---- Leck Kill	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
LkC---- Leck Kill	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
LkD---- Leck Kill	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
LtB---- Leetonia	Very poor.	Poor	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
NoB---- Nolo	Very poor.	Poor	Good	Fair	Fair	Poor	Very poor.	Poor	Fair	Very poor.

See footnote at end of table.

TABLE 13.--WILDLIFE HABITAT POTENTIALS--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
Ph---------- Philo	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
Po---------- Pope	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
RaB---------- Rayne	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
RaC---------- Rayne	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
RaD---------- Rayne	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
UDC*, UDF*. Udorthents										
URB*, URC*: Urban land.										
Udorthents.										
WaB---------- Wharton	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
WaC---------- Wharton	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
WgC*: Wharton----------	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Gilpin----------	Fair	Good	Good	Fair	Fair	Very poor.	Very poor.	Good	Fair	Very poor.
WgD*: Wharton----------	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Gilpin----------	Poor	Fair	Good	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 14.--ENGINEERING INDEX PROPERTIES AND CLASSIFICATIONS

[The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated]

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
AbB, AbC----------	0-3	Silt loam-------	ML, CL	A-4	0-10	80-100	80-95	70-90	55-80	---	---
Albrights	3-31	Channery clay loam, gravelly silt loam, silty clay loam.	ML, CL, SM, SC	A-4, A-6	0-15	80-100	65-95	60-90	40-85	25-40	3-15
	31-80	Silt loam, gravelly silty clay loam, channery clay loam.	CL, ML, SC, SM-SC	A-4, A-2, A-6	0-15	65-100	55-95	40-90	25-80	20-40	3-15
AmB----------	0-6	Silt loam-------	ML, CL	A-4, A-6	0-5	95-100	90-100	80-95	75-85	---	---
Armagh	6-44	Silty clay loam, silty clay, shaly clay.	ML, CL, CH, MH	A-4, A-6, A-7	0-5	80-95	70-90	65-85	60-85	35-55	9-25
	44-60	Silty clay, shaly clay loam, very shaly loam.	GC, SM, GM, SC	A-4, A-6, A-2	0-40	55-90	20-85	15-60	15-45	30-45	9-15
At----------	0-16	Silt loam-------	ML, CL	A-4, A-6	0	90-100	80-100	75-100	60-95	25-40	2-25
Atkins	16-42	Silty clay loam, loam, sandy loam.	SM, SC, ML, CL	A-2, A-4, A-6	0-5	85-100	80-100	50-100	25-85	20-40	1-25
	42-60	Stratified silty clay loam to sandy loam.	SM, SC, GM, ML	A-2, A-4, A-6	0-15	60-100	60-100	50-95	15-85	20-40	1-15
BeB, BeC, BeD------	0-8	Channery silt loam.	GM, ML, GC, SC	A-2, A-4	0-30	50-90	45-85	40-60	30-55	25-36	5-10
Berks	8-26	Channery loam, very channery loam, channery silt loam.	GM, SM, GC, SC	A-1, A-2, A-4	0-30	40-80	35-70	25-60	20-45	25-36	5-10
	26-30	Channery loam, very channery loam, channery silt loam.	GM, SM, GC, SC	A-1, A-2	0-40	35-65	25-55	20-40	15-35	24-38	2-10
	30	Weathered bedrock.	---	---	---	---	---	---	---	---	---
BmB, BmC----------	0-9	Silt loam-------	ML	A-4	0	80-100	60-100	55-90	50-80	---	---
Blairton	9-30	Silt loam, channery silty clay loam, very shaly loam.	ML, CL, GM, SM	A-4, A-6, A-7	0-5	50-90	35-90	30-85	25-70	25-45	5-15
	30-38	Very shaly loam, channery loam, very shaly silt loam.	GM, SM, ML, CL-ML	A-4, A-2, A-6, A-1	0-10	15-65	15-65	15-65	10-60	25-40	5-15
	38	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
BnB----------	0-9	Very stony silt loam.	ML	A-4	3-10	70-100	60-95	55-90	50-85	---	---
Blairton	9-30	Silt loam, channery silt loam, very shaly loam.	ML, CL, GM, SM	A-4, A-6, A-7	0-5	50-90	35-90	30-85	25-70	25-45	5-15
	30-38	Very shaly loam, channery loam, very shaly silt loam.	GM, SM, ML, CL-ML	A-4, A-2, A-6, A-1	0-10	15-65	15-65	15-65	10-60	25-40	5-15
	38	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
BpC*:											
Blairton	0-9	Channery silt loam.	ML	A-4	0-10	70-90	65-75	55-70	50-65	---	---
	9-30	Silt loam, channery silty clay loam, very shaly loam.	ML, CL, GM, SM	A-4, A-6, A-7	0-5	50-90	35-90	30-85	25-70	25-45	5-15
	30-38	Very shaly loam, channery loam, very shaly silt loam.	GM, SM, ML, CL-ML	A-4, A-2, A-6, A-1	0-10	15-65	15-65	15-65	10-60	25-40	5-15
	38	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Berks	0-8	Channery silt loam.	GM, ML, GC, SC	A-2, A-4	0-30	50-90	45-85	40-60	30-55	25-36	5-10
	8-16	Channery loam, very channery loam, channery silt loam.	GM, SM, GC, SC	A-1, A-2, A-4	0-30	40-80	35-70	25-60	20-45	25-36	5-10
	16-30	Channery loam, very channery loam, channery silt loam.	GM, SM, GC, SC	A-1, A-2	0-40	35-65	25-55	20-40	15-35	24-38	2-10
	30	Weathered bedrock.	---	---	---	---	---	---	---	---	---
BtB	0-7	Silt loam	ML	A-4, A-6	0-10	90-100	85-100	85-100	75-100	---	---
Brinkerton	7-28	Silty clay loam, silt loam.	ML	A-4, A-6, A-7	0-10	90-100	85-100	85-100	65-100	30-45	5-15
	28-41	Silt loam, shaly loam, channery silty clay loam.	ML	A-4, A-6, A-7	0-10	75-100	70-100	65-100	55-100	30-45	5-15
	41-60	Silt loam, shaly loam, channery silt loam.	ML, GM, SM	A-4, A-6, A-2	0-40	70-90	35-85	30-85	25-75	30-40	5-15
BvB	0-7	Very stony silt loam.	ML	A-4, A-6	3-10	90-100	85-100	85-100	75-100	---	---
Brinkerton	7-28	Silty clay loam, silt loam.	ML	A-4, A-6, A-7	0-10	90-100	85-100	85-100	65-100	30-45	5-15
	28-41	Silt loam, shaly loam, channery silty clay loam.	ML	A-4, A-6, A-7	0-10	75-100	70-100	65-100	55-100	30-45	5-15
	41-60	Silt loam, shaly loam, channery silt loam.	ML, GM, SM	A-4, A-6, A-2	0-40	70-90	35-85	30-85	25-75	30-40	5-15
CaA, CaB, CaC	0-6	Silt loam	ML, CL	A-4	0-5	90-100	80-100	80-95	75-95	---	---
Cavode	6-42	Silty clay loam, silty clay, clay.	ML, CL, CL-ML	A-4, A-7, A-6	0-5	85-100	80-100	80-95	70-95	25-50	4-20
	42-62	Shaly silty clay loam, silty clay, clay.	ML, CL, GC, GM	A-2, A-4, A-6	0-45	50-100	35-100	30-80	25-75	25-45	2-15
CbB	0-6	Very stony silt loam.	ML, CL	A-4	3-10	90-100	80-100	80-95	75-95	---	---
Cavode	6-42	Silty clay loam, silty clay, clay.	ML, CL, CL-ML	A-4, A-7, A-6	0-5	85-100	80-100	80-95	70-95	25-50	4-20
	42-62	Shaly silty clay loam, silty clay, clay.	ML, CL, GC, GM	A-2, A-4, A-6	0-45	50-100	35-100	30-80	25-75	25-45	2-15

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
CeA*, CeB*, CeC*, CeD*:											
Cookport	0-14	Channery loam	ML, CL, SM, SC	A-2, A-4, A-6	0-15	75-100	60-70	50-60	30-55	20-40	1-15
	14-26	Loam, sandy clay loam, clay loam.	ML, CL, SM, SC	A-4, A-6	0-15	95-100	75-100	60-95	40-75	20-40	1-20
	26-40	Loam, channery sandy clay loam clay loam.	ML, CL, SM, SC	A-4, A-6	0-15	95-100	75-100	60-95	40-75	20-40	1-20
	40-60	Very channery sandy loam, channery loam.	ML, CL, SM-SC, GM-GC	A-2, A-4, A-6	0-15	60-100	50-95	40-95	30-75	20-40	1-15
Ernest	0-8	Silt loam	ML, CL	A-4, A-6	0-15	85-100	80-100	70-95	60-95	25-40	2-15
	8-26	Silty clay loam, silt loam, channery silt loam.	ML, CL	A-4, A-6, A-7	0-15	75-95	70-95	65-90	55-90	25-50	2-25
	26-41	Channery silt loam, channery loam, silty clay loam.	ML, CL, GM, SM	A-4, A-6, A-7	0-20	70-95	55-95	55-90	45-90	20-45	2-25
	41-61	Channery silt loam, silt loam, silty clay loam.	ML, CL, GM, SM	A-4, A-6, A-7	0-20	70-95	45-95	45-90	40-90	25-50	2-25
CvB*:											
Cookport	0-14	Very stony loam	ML, CL, SM, SC	A-4, A-6,	2-40	75-95	70-95	60-90	45-70	20-40	1-15
	14-26	Loam, sandy clay loam, clay loam.	ML, CL, SM, SC	A-4, A-6	0-15	95-100	75-100	60-95	40-75	20-40	1-20
	26-40	Loam, sandy clay loam, clay loam.	ML, CL, SM, SC	A-4, A-6	0-15	95-100	75-100	60-95	40-75	20-40	1-20
	40-60	Very channery sandy loam, channery loam.	ML, CL, SM-SC, GM-GC	A-2, A-4, A-6	0-15	60-100	50-95	40-95	30-75	20-40	1-15
Ernest	0-8	Very stony silt loam.	ML, CL	A-4, A-6	3-20	85-100	80-100	70-95	60-95	15-40	2-15
	8-26	Silty clay loam, silt loam, channery silt loam.	ML, CL	A-4, A-6, A-7	0-15	75-95	70-95	65-90	55-90	25-50	2-25
	26-41	Channery silt loam, channery loam, silty clay loam.	ML, CL, GM, SC	A-4, A-6, A-7	0-20	70-95	55-95	55-90	45-90	20-45	2-25
	41-60	Channery silt loam, silt loam, silty clay loam.	ML, CL, GM, SC	A-4, A-6, A-7	0-20	70-95	45-95	45-90	40-90	25-50	2-25
CvD*:											
Cookport	0-14	Very stony loam	ML, CL, SM, SC	A-4, A-6,	2-40	75-95	70-95	60-90	45-70	20-40	1-15
	14-26	Loam, sandy clay loam, clay loam.	ML, CL, SM, SC	A-4, A-6	0-15	95-100	75-100	60-95	40-75	20-40	1-20
	26-40	Loam, sandy clay loam, clay loam.	ML, CL, SM, SC	A-4, A-6	0-15	95-100	75-100	60-95	40-75	20-40	1-20
	40-60	Very channery sandy loam, channery loam.	ML, CL, SM-SC, GM-GC	A-2, A-4, A-6	0-15	60-100	50-95	40-95	30-75	20-40	1-15

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
CvD*:											
Ernest	0-8	Very stony silt loam.	ML, CL	A-4, A-6	3-20	85-100	80-100	70-95	60-95	15-40	2-15
	8-26	Silty clay loam, silt loam, channery silt loam.	ML, CL	A-4, A-6, A-7	0-15	75-95	70-95	65-90	55-90	25-50	2-25
	26-41	Channery silt loam, channery loam, silty clay loam.	ML, CL, GM, SC	A-4, A-6, A-7	0-20	70-95	55-95	55-90	45-90	20-45	2-25
	41-61	Channery silt loam, silt loam, silty clay loam.	ML, CL, GM, SC	A-4, A-6, A-7	0-20	70-95	45-95	45-90	40-90	25-50	2-25
Dp*, Du*. Dumps											
GnB	0-18	Silt loam	ML, CL, CL-ML	A-4, A-6	0-5	80-95	75-90	70-85	65-80	20-40	4-15
Gilpin	18-28	Channery loam, shaly silt loam, silty clay loam.	GM, ML, CL, CL-ML	A-2, A-4, A-6	0-30	50-95	45-90	35-85	30-80	20-40	4-15
	28-38	Channery loam, very channery silt loam, very shaly silty clay loam.	GM, GC, GM-GC	A-1, A-2, A-4	0-35	25-55	20-50	15-45	15-40	20-40	4-15
	38	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
GpB, GpD	0-18	Very stony silt loam.	CL-ML, ML, CL	A-4, A-6	10-40	80-95	75-90	70-85	65-80	20-40	4-15
Gilpin	18-28	Shaly silt loam, channery loam, silty clay loam.	GM, ML, CL, CL-ML	A-2, A-4, A-6	0-30	50-90	45-85	35-75	30-70	20-40	4-15
	28-38	Channery loam, very channery silt loam, very shaly silty clay loam.	GM, GC, GM-GC	A-1, A-2, A-4	0-35	25-55	20-50	15-45	15-40	20-40	4-15
	38	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
GtC*:											
Gilpin	0-18	Silt loam	ML, CL, CL-ML	A-4, A-6	0-5	80-95	75-90	70-85	65-80	20-40	4-15
	18-28	Channery loam, shaly silt loam, silty clay loam.	GM, ML, CL, CL-ML	A-2, A-4, A-6	0-30	50-95	45-90	35-85	30-80	20-40	4-15
	28-38	Channery loam, very channery silt loam, very shaly silty clay loam.	GM, GC, GM-GC	A-1, A-2, A-4	0-35	25-55	20-50	15-45	15-40	20-40	4-15
	38	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
GtC*:											
Rayne	0-8	Silt loam	ML, CL	A-4	0-5	85-100	80-100	70-85	60-80	---	---
	8-40	Loam, shaly silty clay loam, channery clay loam.	GM, ML, GC, CL	A-4, A-6, A-2	0-15	60-95	55-85	40-85	30-60	20-40	2-15
	40-60	Channery sandy loam, shaly silt loam, very shaly silty clay loam.	SM, ML, GM, GP-GM	A-4, A-2, A-1	0-35	40-90	15-80	15-75	10-60	20-35	NP-10
GtD*:											
Gilpin	0-18	Silt loam	ML, CL, CL-ML	A-4, A-6	0-5	80-95	75-90	70-85	65-80	20-40	4-15
	18-28	Channery loam, shaly silt loam, silty clay loam.	GM, ML, CL, CL-ML	A-2, A-4, A-6	0-30	50-95	45-90	35-85	30-80	20-40	4-15
	28-38	Channery loam, very channery silt loam, very shaly silty clay loam.	GM, GC, GM-GC	A-1, A-2, A-4	0-35	25-55	20-50	15-45	15-40	20-40	4-15
	38	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rayne	0-8	Silt loam	ML, CL	A-4	0-5	85-100	80-100	70-85	60-80	---	---
	8-40	Loam, shaly silty clay loam, channery clay loam.	GM, ML, GC, CL	A-4, A-6, A-2	0-15	60-95	55-85	40-85	30-60	20-40	2-15
	40-60	Channery sandy loam, shaly silt loam, very shaly silty clay loam.	SM, ML, GM, GP-GM	A-4, A-2, A-1	0-35	40-90	15-80	15-75	10-60	20-35	NP-10
GwB*, GwC*, GwD*:											
Gilpin	0-18	Channery silt loam.	ML, CL, CL-ML	A-4, A-6,	0-30	80-90	70-85	65-75	55-70	20-40	4-15
	18-28	Channery loam, shaly silt loam, silty clay loam.	GM, ML, CL, CL-ML	A-2, A-4, A-6	0-30	50-95	45-90	35-85	30-80	20-40	4-15
	28-38	Channery loam, very channery silt loam, very shaly silty clay loam.	GM, GC, GM-GC	A-1, A-2, A-4	0-35	25-55	20-50	15-45	15-40	20-40	4-15
	38	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Weikert	0-9	Channery silt loam.	GM, ML, SM	A-1, A-2, A-4	0-10	35-70	35-70	25-65	20-55	30-40	4-10
	9-19	Shaly loam, very shaly silt loam, channery loam.	GM, GP, SM	A-1, A-2	0-20	15-60	10-45	5-35	5-35	28-36	3-9
	19	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
GWF*:											
Gilpin	0-18	Channery silt loam.	ML, CL, CL-ML	A-4, A-6	0-30	80-90	70-85	65-75	55-70	20-40	4-15
	18-28	Channery loam, shaly silt loam, silty clay loam.	GM, ML, CL, CL-ML	A-2, A-4, A-6	0-30	50-95	45-90	35-85	30-80	20-40	4-15
	28-38	Channery loam, very channery silt loam, very shaly silty clay loam.	GM, GC, GM-GC	A-1, A-2, A-4	0-35	25-55	20-50	15-45	15-40	20-40	4-15
	38	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Weikert	0-9	Channery silt loam.	GM, ML, SM	A-1, A-2, A-4	0-10	35-70	35-70	25-65	20-55	30-40	4-10
	9-19	Shaly loam, very shaly silt loam, channery loam.	GM, GP, SM	A-1, A-2	0-20	15-60	10-45	5-35	5-35	28-36	3-9
	19	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
HaB, HaC, HaD---- Hazleton	0-8	Channery loam---	ML, GM, SM	A-2, A-4	0-5	85-95	80-90	60-75	35-55	---	---
	8-28	Channery sandy loam, loam, very channery loam.	GM, SM, ML, SC	A-2, A-4, A-1	0-50	60-95	45-90	35-70	20-55	<30	NP-8
	28-62	Channery loam, very channery sandy loam, very channery loamy sand.	GM, SM, SC, GC	A-2, A-1, A-4	0-60	55-80	35-75	25-65	15-50	<30	NP-8
HbB, HbD---- Hazleton	0-8	Very stony loam	ML, GM, SM	A-4, A-2	5-15	80-95	80-90	50-70	35-55	---	---
	8-28	Channery sandy loam, channery loam, loam.	GM, SM, ML, SC	A-2, A-4, A-1	0-50	60-95	45-90	35-70	20-55	<30	NP-8
	28-62	Channery loam, very channery sandy loam, very channery loamy sand.	GM, SM, SC, GC	A-2, A-1, A-4	5-60	55-80	35-75	25-65	15-50	<30	NP-8
Hx---- Hazleton	0-8	Extremely bouldery sandy loam.	GM, SM, ML	A-4, A-2	15-50	60-95	50-90	50-70	35-55	---	---
	8-28	Channery sandy loam, channery loam, loam.	GM, SM, ML, SC	A-2, A-4, A-1	0-50	60-95	45-90	35-70	20-55	<30	NP-8
	28-62	Channery loam, very channery sandy loam, very channery loamy sand.	GM, SM, SC, GC	A-2, A-1, A-4	5-60	55-80	35-75	25-65	15-50	<30	NP-8

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
LaB, LaC---------- Laidig	0-16	Loam----------	GM, SM, ML, CL-ML	A-4	0-5	65-90	55-80	50-80	35-70	15-30	1-10
	16-36	Channery loam, channery sandy clay loam, channery sandy loam.	SM, SC, CL-ML, GM-GC	A-2, A-4, A-6	5-30	70-95	55-90	40-80	20-70	15-40	2-18
	36-65	Channery sandy clay loam, channery loam, channery sandy loam.	GC, SC, GM-GC, CL-ML	A-2, A-4, A-6, A-1	5-40	50-90	40-85	30-80	15-70	15-35	2-16
LDF*---------- Laidig	0-16	Very stony loam	GM-GC, SM, CL-ML, SM-SC	A-4	1-10	70-100	65-100	55-95	45-75	15-30	NP-10
	16-36	Channery loam, channery sandy clay loam, channery sandy loam.	SM, GM-GC, SC, CL-ML	A-2, A-4, A-6, A-1	5-30	70-95	55-90	40-80	20-70	15-40	2-18
	36-65	Channery sandy clay loam, channery loam, channery sandy loam.	SC, GM-GC, GC, CL-ML	A-2, A-4, A-6, A-1	5-40	50-90	40-85	30-80	15-20	15-35	2-16
LkB, LkC, LkD------ Leck Kill	0-7	Silt loam-------	ML, CL	A-4	0	85-100	75-95	65-95	50-85	---	---
	7-36	Silt loam, channery loam, shaly silty clay loam.	GM, SC, GC, CL	A-4, A-2, A-6	0-10	60-90	50-85	40-80	30-70	23-40	2-17
	36-45	Very channery silt loam, very channery clay loam, very shaly loam.	SM, GM, GP-GM	A-2, A-1	0-30	30-70	10-30	8-30	6-25	25-40	2-13
	45	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
LtB---------- Leetonia	0-11	Very stony loamy sand.	GW, GM, SW, SM	A-1, A-2	20-50	45-85	35-70	20-55	2-20	---	NP
	11-60	Gravelly loamy sand, very gravelly loam.	GW, GM, SW, SM	A-1, A-2	15-50	45-85	25-70	20-55	2-20	---	NP
	60-85	Very gravelly sand, very gravelly loamy sand.	GW, GM, SW, SM	A-1	30-40	45-60	35-50	20-35	2-15	---	NP
NoB----------	0-9	Very stony sandy loam.	ML	A-4	3-10	75-100	75-100	70-100	60-90	---	---
Nolo	9-19	Silt loam, channery clay loam, channery sandy clay loam.	ML	A-6, A-4	0-15	80-100	80-100	80-95	55-85	25-40	4-11
	19-60	Loam, channery sandy clay loam, channery clay loam.	ML, SM, GM	A-4, A-6	0-15	60-100	60-90	55-85	35-70	25-35	4-11
Ph---------- Philo	0-42	Silt loam-------	ML, SM	A-4	0-5	95-100	75-100	70-90	45-80	20-40	1-10
	42-60	Stratified sand to silt loam.	GM, SM, ML	A-2, A-4	0-5	60-95	50-90	40-85	30-85	20-40	1-10

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
Po---------- Pope	0-9	Silt loam-------	ML, CL, SM, CL-ML	A-4	0-5	75-100	65-100	55-95	40-90	<30	NP-10
	9-30	Fine sandy loam, sandy loam, gravelly fine sandy loam.	SM, SM-SC, ML, GM	A-2, A-1, A-4	0-5	55-100	50-100	35-95	15-70	<30	NP-7
	30-60	Fine sandy loam, sandy loam, gravelly fine sandy loam.	SM, SM-SC, ML, GM	A-2, A-1, A-4	0-20	45-100	35-100	30-95	15-70	<30	NP-7
RaB, RaC, RaD------ Rayne	0-8	Silt loam-------	ML, CL	A-4	0-5	85-100	80-100	70-85	60-80	---	---
	8-40	Loam, shaly silty clay loam, channery clay loam.	GM, ML, GC, CL	A-4, A-6, A-2	0-15	60-95	55-85	40-85	30-60	20-40	2-15
	40-60	Channery sandy loam, shaly silt loam, very shaly silty clay loam.	SM, ML, GM, GP-GM	A-4, A-2, A-1	0-35	40-90	15-80	15-75	10-60	20-35	NP-10
UDC*, UDF*. Udorthents											
URB*, URC*: Urban land.											
Udorthents.											
WaB, WaC---------- Wharton	0-8	Silt loam-------	ML, CL	A-4, A-6	0-5	95-100	90-100	80-95	70-90	---	---
	8-36	Clay loam, shaly silty clay loam, shaly silt loam.	ML, CL	A-7, A-6	0-10	75-100	70-100	65-95	60-90	35-45	10-30
	36-60	Silt loam, shaly clay, very shaly silt loam.	ML, GM, SM	A-4, A-6, A-7, A-2	0-50	45-100	30-100	25-95	25-90	30-45	5-15
WgC*, WgD*: Wharton----------	0-8	Silt loam-------	ML, CL	A-4, A-6	0-5	95-100	90-100	80-95	70-90	---	---
	8-36	Clay loam, shaly silty clay loam, shaly silt loam.	ML, CL	A-7, A-6	0-10	75-100	70-100	65-95	60-90	35-45	10-30
	36-60	Silt loam, shaly clay, very shaly silt loam.	ML, GM, SM	A-4, A-6, A-7, A-2	0-50	45-100	30-100	25-95	25-90	30-45	5-15
Gilpin----------	0-18	Silt loam-------	ML, CL, CL-ML	A-4, A-6	0-5	80-95	75-90	70-85	65-80	20-40	4-15
	18-28	Channery loam, shaly silt loam, silty clay loam.	GM, ML, CL, CL-ML	A-2, A-4, A-6	0-30	50-95	45-90	35-85	30-80	20-40	4-15
	28-38	Channery loam, very channery silt loam, very shaly silty clay loam.	GM, GC, GM-GC	A-1, A-2, A-4	0-35	25-55	20-50	15-45	15-40	20-40	4-15
	38	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS

[The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated]

Soil name and map symbol	Depth	Clay <2mm	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	G/cm³	In/hr	In/in	pH				Pct
AbB, AbC----------	0-3	15-27	1.20-1.40	0.6-2.0	0.16-0.20	3.6-5.5	Low----------	0.32	3-2	1-4
Albrights	3-31	18-35	1.30-1.50	0.6-2.0	0.10-0.14	3.6-5.5	Low----------	0.28		
	31-80	18-35	1.40-1.70	0.2-0.6	0.04-0.08	4.5-6.5	Low----------	0.28		
AmB----------	0-6	15-32	1.20-1.40	0.6-2.0	0.18-0.22	4.5-5.5	Low----------	0.37	3-2	1-4
Armagh	6-44	35-55	1.30-1.60	0.06-0.2	0.10-0.14	4.5-5.5	Moderate-----	0.28		
	44-60	15-55	1.20-1.60	0.06-0.6	0.08-0.12	4.5-5.5	Moderate-----	0.17		
At----------	0-16	15-35	1.20-1.40	0.6-2.0	0.14-0.22	4.5-5.5	Low----------	0.28	5	2-5
Atkins	16-42	18-35	1.20-1.50	0.06-2.0	0.14-0.18	4.5-5.5	Low----------	0.28		
	42-60	10-35	1.20-1.50	0.2-6.0	0.08-0.18	4.5-5.5	Low----------	0.28		
BeB, BeC, BeD----	0-8	5-23	1.20-1.50	0.6-6.0	0.08-0.12	3.6-6.5	Low----------	0.24	3	.5-3
Berks	8-26	5-20	1.20-1.60	0.6-6.0	0.04-0.10	3.6-6.5	Low----------	0.17		
	26-30	5-20	1.20-1.60	2.0-6.0	0.04-0.10	3.6-6.5	Low----------	0.17		
	30	---	---	---	---	---	----------	----		
BmB, BmC----------	0-9	10-27	1.40-1.60	0.6-2.0	0.14-0.18	3.6-5.5	Low----------	0.32	3-2	1-4
Blairton	9-30	18-35	1.50-1.70	0.2-0.6	0.08-0.14	3.6-5.5	Low----------	0.28		
	30-38	10-27	1.40-1.60	0.2-2.0	0.04-0.10	3.6-5.5	Low----------	0.28		
	38	---	---	---	---	---	----------	----		
BnB----------	0-9	10-27	1.40-1.60	0.6-2.0	0.12-0.16	3.6-5.5	Low----------	0.28	3	---
Blairton	9-30	18-35	1.50-1.70	0.2-0.6	0.08-0.14	3.6-5.5	Low----------	0.28		
	30-38	10-27	1.40-1.60	0.2-2.0	0.04-0.10	3.6-5.5	Low----------	0.28		
	38	---	---	---	---	---	----------	----		
BpC*:										
Blairton--------	0-9	10-27	1.40-1.60	0.6-2.0	0.12-0.16	3.6-5.5	Low----------	0.28	3-2	1-4
	9-30	18-35	1.50-1.70	0.2-0.6	0.08-0.14	3.6-5.5	Low----------	0.28		
	30-38	10-27	1.40-1.60	0.2-2.0	0.04-0.10	3.6-5.5	Low----------	0.28		
	38	---	---	---	---	---	----------	----		
Berks----------	0-8	5-23	1.20-1.50	0.6-6.0	0.08-0.12	3.6-6.5	Low----------	0.24	3	.5-3
	8-16	5-20	1.20-1.60	0.6-6.0	0.04-0.10	3.6-6.5	Low----------	0.17		
	16-30	5-20	1.20-1.60	2.0-6.0	0.04-0.10	3.6-6.5	Low----------	0.17		
	30	---	---	---	---	---	----------	----		
BtB----------	0-7	15-30	1.20-1.40	0.6-2.0	0.18-0.24	4.5-6.0	Low----------	0.43	3-2	1-4
Brinkerton	7-28	15-35	1.20-1.50	0.6-2.0	0.14-0.18	4.5-6.0	Moderate-----	0.32		
	28-41	15-35	1.30-1.60	0.06-0.2	0.08-0.12	4.5-6.0	Moderate-----	0.32		
	41-60	15-25	1.20-1.60	0.06-0.6	0.14-0.18	5.1-6.5	Low----------	0.20		
BvB----------	0-7	15-35	1.20-1.40	0.6-2.0	0.18-0.24	4.5-6.0	Low----------	0.43	3-2	---
Brinkerton	7-28	15-35	1.20-1.50	0.6-2.0	0.14-0.18	4.5-6.0	Moderate-----	0.32		
	28-41	15-35	1.30-1.60	0.06-0.2	0.08-0.12	4.5-6.0	Moderate-----	0.32		
	41-60	15-25	1.20-1.60	0.06-0.6	0.14-0.18	5.1-6.5	Low----------	0.20		
CaA, CaB, CaC----	0-6	15-35	1.20-1.40	0.6-2.0	0.18-0.22	4.5-5.5	Low----------	0.43	3-2	2-4
Cavode	6-42	35-45	1.20-1.50	0.06-0.2	0.10-0.14	4.5-5.5	Moderate-----	0.28		
	42-62	35-45	1.20-1.50	0.06-0.2	0.08-0.12	4.5-5.5	Moderate-----	0.28		
CbB----------	0-6	15-27	1.20-1.40	0.6-2.0	0.18-0.22	4.5-5.5	Low----------	0.43	3	---
Cavode	6-42	35-45	1.20-1.50	0.06-0.2	0.10-0.14	4.5-5.5	Moderate-----	0.28		
	42-62	35-45	1.20-1.50	0.06-0.2	0.08-0.12	4.5-5.5	Moderate-----	0.28		
CeA*, CeB*, CeC*, CeD*:										
Cookport--------	0-14	10-27	1.20-1.40	0.6-2.0	0.12-0.16	4.5-5.5	Low----------	0.32	3	1-4
	14-26	15-35	1.20-1.50	0.6-2.0	0.12-0.16	4.5-5.5	Low----------	0.28		
	26-40	15-35	1.40-1.70	0.06-0.6	0.08-0.12	4.5-5.5	Low----------	0.28		
	40-60	10-27	1.20-1.50	0.2-0.6	0.08-0.12	4.5-5.5	Low----------	0.28		

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Clay <2mm	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	G/cm3	In/hr	In/in	pH				Pct
CeA*, CeB*, CeC*, CeD*:										
Ernest	0-8	16-20	1.20-1.40	0.6-2.0	0.14-0.20	4.5-5.5	Low	0.43	3	2-4
	8-26	20-35	1.30-1.50	0.6-2.0	0.12-0.16	4.5-5.5	Moderate	0.28		
	26-41	18-30	1.30-1.60	0.06-0.6	0.08-0.12	4.5-5.5	Low	0.28		
	41-61	20-35	1.20-1.50	0.06-0.6	0.08-0.12	4.5-5.5	Moderate	0.28		
CvB*:										
Cookport	0-14	10-27	1.20-1.40	0.6-2.0	0.12-0.16	4.5-5.5	Low	0.32	3	---
	14-26	15-35	1.20-1.50	0.6-2.0	0.12-0.16	4.5-5.5	Low	0.28		
	26-40	15-35	1.40-1.70	0.06-0.6	0.08-0.12	4.5-5.5	Low	0.28		
	40-60	10-27	1.20-1.50	0.2-0.6	0.08-0.12	4.5-5.5	Low	0.28		
Ernest	0-8	15-20	1.20-1.40	0.6-2.0	0.12-0.18	4.5-5.5	Low	0.32	3	---
	8-26	20-35	1.30-1.50	0.6-2.0	0.12-0.16	4.5-5.5	Moderate	0.28		
	26-41	18-30	1.30-1.60	0.06-0.6	0.08-0.12	4.5-5.5	Low	0.28		
	41-60	20-35	1.20-1.50	0.06-0.6	0.08-0.12	4.5-5.5	Moderate	0.28		
CvD*:										
Cookport	0-14	10-27	1.20-1.40	0.6-2.0	0.12-0.16	4.5-5.5	Low	0.32	3	---
	14-26	15-35	1.20-1.50	0.6-2.0	0.12-0.16	4.5-5.5	Low	0.28		
	26-40	15-35	1.40-1.70	0.06-0.6	0.08-0.12	4.5-5.5	Low	0.28		
	40-60	10-27	1.20-1.50	0.2-0.6	0.08-0.12	4.5-5.5	Low	0.28		
Ernest	0-8	15-20	1.20-1.40	0.6-2.0	0.12-0.18	4.5-5.5	Low	0.32	3	---
	8-26	20-35	1.30-1.50	0.6-2.0	0.12-0.16	4.5-5.5	Moderate	0.28		
	26-41	18-30	1.30-1.60	0.06-0.6	0.08-0.12	4.5-5.5	Low	0.28		
	41-61	20-35	1.20-1.50	0.06-0.6	0.08-0.12	4.5-5.5	Moderate	0.28		
Dp*, Du*. Dumps										
GnB	0-18	15-27	1.20-1.40	0.6-2.0	0.12-0.18	3.6-5.5	Low	0.32	3	1-4
Gilpin	18-28	18-35	1.20-1.50	0.6-2.0	0.10-0.16	3.6-5.5	Low	0.28		
	28-38	15-35	1.20-1.50	0.6-2.0	0.06-0.10	3.6-5.5	Low	0.28		
	38	---	---	---	---	---	---	---		
GpB, GpD	0-18	15-27	1.20-1.40	0.6-2.0	0.08-0.14	3.6-5.5	Low	0.28	3	---
Gilpin	18-28	18-35	1.20-1.50	0.6-2.0	0.10-0.16	3.6-5.5	Low	0.28		
	28-38	15-35	1.20-1.50	0.6-2.0	0.06-0.10	3.6-5.5	Low	0.28		
	38	---	---	---	---	---	---	---		
GtC*:										
Gilpin	0-18	15-27	1.20-1.40	0.6-2.0	0.12-0.18	3.6-5.5	Low	0.32	3	1-4
	18-28	18-35	1.20-1.50	0.6-2.0	0.10-0.16	3.6-5.5	Low	0.28		
	28-38	15-35	1.20-1.50	0.6-2.0	0.06-0.10	3.6-5.5	Low	0.28		
	38	---	---	---	---	---	---	---		
Rayne	0-8	10-27	1.20-1.40	0.6-2.0	0.14-0.18	4.5-5.5	Low	0.28	4	1-3
	8-40	18-35	1.20-1.40	0.6-2.0	0.12-0.16	4.5-5.5	Low	0.28		
	40-60	10-30	1.20-1.40	0.6-2.0	0.10-0.16	4.5-5.5	Low	0.28		
GtD*:										
Gilpin	0-18	15-27	1.20-1.40	0.6-2.0	0.12-0.18	3.6-5.5	Low	0.32	3	1-4
	18-28	18-35	1.20-1.50	0.6-2.0	0.10-0.16	3.6-5.5	Low	0.28		
	28-38	15-35	1.20-1.50	0.6-2.0	0.06-0.10	3.6-5.5	Low	0.28		
	38	---	---	---	---	---	---	---		
Rayne	0-8	10-27	1.20-1.40	0.6-2.0	0.14-0.18	4.5-5.5	Low	0.28	4	1-3
	8-40	18-35	1.20-1.40	0.6-2.0	0.12-0.16	4.5-5.5	Low	0.28		
	40-60	10-30	1.20-1.40	0.6-2.0	0.10-0.16	4.5-5.5	Low	0.28		
GwB*, GwC*, GwD*:										
Gilpin	0-18	15-27	1.20-1.40	0.6-2.0	0.10-0.16	3.6-5.5	Low	0.28	3	1-4
	18-28	18-35	1.20-1.50	0.6-2.0	0.10-0.16	3.6-5.5	Low	0.28		
	28-38	15-35	1.20-1.50	0.6-2.0	0.06-0.10	3.6-5.5	Low	0.28		
	38	---	---	---	---	---	---	---		

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Clay <2mm	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	G/cm^3	In/hr	In/in	pH				Pct
GwB*, GwC*, GwD*:										
Weikert	0-9	15-27	1.20-1.40	2.0-6.0	0.08-0.14	4.5-6.0	Low	0.28	2	1-3
	9-19	15-27	1.20-1.40	2.0-6.0	0.04-0.08	4.5-6.0	Low	0.28		
	19	---	---	---	---	---	---	---		
GWF*:										
Gilpin	0-18	15-27	1.20-1.40	0.6-2.0	0.10-0.16	3.6-5.5	Low	0.28	3	1-4
	18-28	18-35	1.20-1.50	0.6-2.0	0.10-0.16	3.6-5.5	Low	0.28		
	28-38	15-35	1.20-1.50	0.6-2.0	0.06-0.10	3.6-5.5	Low	0.28		
	38	---	---	---	---	---	---	---		
Weikert	0-9	15-27	1.20-1.40	2.0-6.0	0.08-0.14	4.5-6.0	Low	0.28	2	1-3
	9-19	15-27	1.20-1.40	2.0-6.0	0.04-0.08	4.5-6.0	Low	0.28		
	19	---	---	---	---	---	---	---		
HaB, HaC, HaD	0-8	7-18	1.20-1.40	2.0-6.0	0.10-0.14	3.6-5.5	Low	0.24	3-2	2-4
Hazleton	8-28	7-18	1.20-1.40	2.0-20	0.08-0.12	3.6-5.5	Low	0.17		
	28-62	5-15	1.20-1.40	2.0-20	0.04-0.10	3.6-5.5	Low	0.17		
HbB, HbD, Hx	0-8	7-18	1.20-1.40	2.0-6.0	0.10-0.16	3.6-5.5	Low	0.24	3-2	---
Hazleton	8-28	7-18	1.20-1.40	2.0-20	0.08-0.12	3.6-5.5	Low	0.17		
	28-62	5-15	1.20-1.40	2.0-20	0.04-0.10	3.6-5.5	Low	0.17		
LaB, LaC	0-16	10-27	1.20-1.40	0.6-6.0	0.08-0.12	3.6-5.5	Low	0.28	4	1-4
Laidig	16-36	18-35	1.30-1.50	0.6-6.0	0.08-0.12	3.6-5.5	Low	0.28		
	36-65	10-27	1.30-1.60	0.2-0.6	0.06-0.10	3.6-5.5	Low	0.17		
LDF*	0-16	7-27	1.20-1.40	0.6-6.0	0.08-0.12	3.6-5.5	Low	0.28	4	---
Laidig	16-36	18-35	1.30-1.50	0.6-6.0	0.08-0.12	3.6-5.5	Low	0.28		
	36-65	18-35	1.30-1.60	0.2-0.6	0.06-0.10	3.6-5.5	Low	0.17		
LkB, LkC, LkD	0-7	10-20	1.20-1.50	0.6-6.0	0.16-0.20	4.5-7.3	Low	0.28	3	1-3
Leck Kill	7-36	17-32	1.40-1.70	0.6-6.0	0.12-0.16	4.5-7.3	Low	0.17		
	36-45	17-32	1.30-1.60	0.6-6.0	0.04-0.08	4.5-6.0	Low	0.28		
	45	---	---	---	---	---	---	---		
LtB	0-11	3-10	1.10-1.30	2.0-6.0	0.03-0.05	3.6-5.0	Low	0.17	3	---
Leetonia	11-60	3-15	1.10-1.30	2.0-6.0	0.03-0.05	3.6-5.0	Low	0.17		
	60-85	3-15	1.10-1.30	6.0-20	0.02-0.03	3.6-5.0	Low	0.17		
NoB	0-9	10-20	1.20-1.40	0.6-2.0	0.14-0.20	3.6-5.0	Low	0.32	3-2	---
Nolo	9-19	18-35	1.30-1.50	0.6-2.0	0.12-0.16	3.6-5.0	Low	0.28		
	19-60	18-35	1.30-1.60	0.06-0.2	0.06-0.10	3.6-5.0	Low	0.17		
Ph	0-42	10-18	1.20-1.40	0.2-2.0	0.12-0.20	4.5-6.0	Low	0.32	5	2-4
Philo	42-60	5-18	1.20-1.40	2.0-20.0	0.06-0.10	4.5-6.0	Low	0.32		
Po	0-9	5-15	1.2-1.4	0.6-2.0	0.10-0.20	3.6-5.5	Low	0.28	5	1-4
Pope	9-30	5-18	1.2-1.5	0.6-6.0	0.07-0.15	3.6-5.5	Low	0.28		
	30-60	5-20	1.2-1.5	0.6-6.0	0.06-0.15	3.6-5.5	Low	0.28		
RaB, RaC, RaD	0-8	10-27	1.20-1.40	0.6-2.0	0.14-0.18	4.5-5.5	Low	0.28	4	1-3
Rayne	8-40	18-35	1.20-1.40	0.6-2.0	0.12-0.16	4.5-5.5	Low	0.28		
	40-60	10-30	1.20-1.40	0.6-2.0	0.10-0.16	4.5-5.5	Low	0.28		
UDC*, UDF*.										
Udorthents										
URB*, URC*:										
Urban land.										
Udorthents.										
WaB, WaC	0-8	15-25	1.10-1.30	0.6-2.0	0.16-0.20	4.5-5.5	Low	0.32	3	1-4
Wharton	8-36	15-35	1.20-1.50	0.06-0.6	0.12-0.16	4.5-5.5	Moderate	0.28		
	36-60	20-45	1.20-1.60	0.06-0.6	0.08-0.12	4.0-5.5	Moderate	0.17		

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Clay <2mm	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	G/cm^3	In/hr	In/in	pH				Pct
WgC*, WgD*:										
Wharton----------	0-8	15-25	1.10-1.30	0.5-2.0	0.16-0.20	4.5-5.5	Low----------	0.32	3	1-4
	8-36	15-35	1.20-1.50	0.06-0.6	0.12-0.16	4.5-5.5	Moderate-----	0.28		
	36-60	20-45	1.20-1.60	0.06-0.6	0.08-0.12	4.0-5.5	Moderate-----	0.17		
Gilpin----------	0-18	15-27	1.20-1.40	0.6-2.0	0.12-0.18	3.6-5.5	Low----------	0.32	3	1-4
	18-28	18-35	1.20-1.50	0.6-2.0	0.10-0.16	3.6-5.5	Low----------	0.28		
	28-38	15-35	1.20-1.50	0.6-2.0	0.06-0.10	3.6-5.5	Low----------	0.28		
	38	---	---	---	---	---	----------	----		

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 16.--SOIL AND WATER FEATURES

[The definitions of "flooding" and "water table" in the text explain terms such as "rare," "brief," "apparent," and "perched." The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern]

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness		Uncoated steel	Concrete
					Ft			In				
AbB, AbC---------- Albrights	C	None--------	---	---	1.0-3.0	Perched	Nov-Mar	>60	---	Moderate	High-----	High.
AmB---------- Armagh	D	None--------	---	---	0.0-0.5	Apparent	Oct-Jun	40-72	Rippable	High-----	High-----	High.
At---------- Atkins	D	Common------	Very brief	Sep-Jul	0-0.5	Apparent	Nov-Jun	>60	---	High-----	High-----	Moderate.
BeB, BeC, BeD----- Berks	C	None--------	---	---	>6.0	---	---	20-40	Rippable	Low------	Low------	High.
BmB, BmC, BnB----- Blairton	C	None--------	---	---	1.0-2.0	Perched	Nov-Mar	20-40	Rippable	High-----	High-----	High.
BpC*:												
Blairton---------	C	None--------	---	---	1.0-2.0	Perched	Nov-Mar	20-40	Rippable	High-----	High-----	High.
Berks------------	C	None--------	---	---	>6.0	---	---	20-40	Rippable	Low------	Low------	High.
BtB, BvB---------- Brinkerton	D	None--------	---	---	0.0-0.5	Perched	Sep-Jun	>60	---	High-----	High-----	High.
CaA, CaB, CaC, CbB---------- Cavode	C	None--------	---	---	0.5-1.5	Perched	Oct-May	40-72	Rippable	High-----	High-----	High.
CeA*, CeB*, CeC*, CeD*:												
Cookport--------	C	None--------	---	---	1.5-3.0	Perched	Dec-Apr	>40	Hard	Moderate	Moderate	Moderate.
Ernest----------	C	None--------	---	---	1.5-3.0	Perched	Dec-Apr	>60	---	Moderate	Moderate	Moderate.
CvB*, CvD*:												
Cookport---------	C	None--------	---	---	1.5-3.0	Perched	Dec-Apr	>40	Hard	Moderate	Moderate	Moderate.
Ernest-----------	C	None--------	---	---	1.5-3.0	Perched	Dec-Apr	>60	---	Moderate	Moderate	Moderate.
Dp*, Du*. Dumps												
GnB, GpB, GpD----- Gilpin	C	None--------	---	---	>6.0	---	---	20-40	Rippable	Moderate	Low------	High.
GtC*, GtD*:												
Gilpin-----------	C	None--------	---	---	>6.0	---	---	20-40	Rippable	Moderate	Low------	High.
Rayne------------	B	None--------	---	---	>6.0	---	---	40-72	Rippable	Moderate	Low------	High.

See footnote at end of table.

TABLE 16.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness		Uncoated steel	Concrete
					Ft			In				
GwB*, GwC*, GwD*, GWF*:												
Gilpin	C	None	---	---	>6.0	---	---	20-40	Rippable	Moderate	Low	High.
Weikert	C/D	None	---	---	>6.0	---	---	10-20	Rippable	Moderate	Moderate	Moderate.
HaB, HaC, HaD, HbB, HbD Hazleton	B	None	---	---	>6.0	---	---	>40	Rippable	Moderate	Low	High.
Hx Hazleton	B	None	---	---	>6.0	---	---	>40	Rippable	Moderate	Low	High.
LaB, LaC, LDF* Laidig	C	None	---	---	>3.0	Perched	Jan-Mar	>60	---	Moderate	Moderate	High.
LkB, LkC, LkD Leck Kill	B	None	---	---	>6.0	---	---	40-72	Rippable	Moderate	Low	Moderate.
LtB Leetonia	C	None	---	---	>6.0	---	---	>60	---	Low	Low	High.
NoB Nolo	D	None	---	---	0.0-0.5	Perched	Sep-Jun	>40	Rippable	High	High	High.
Ph Philo	B	Common	Very brief	Nov-May	1.5-3.0	Apparent	Dec-Apr	>40	Hard	Moderate	Low	High.
Po Pope	B	Common	Very brief	Nov-Apr	>6.0	---	---	>40	Hard	Moderate	Low	High.
RaB, RaC, RaD Rayne	B	None	---	---	>6.0	---	---	40-72	Rippable	Moderate	Low	High.
UDC*, UDF*. Udorthents												
URB*, URC*: Urban land.												
Udorthents.												
WaB, WaC Wharton	C	None	---	---	1.5-3.0	Perched	Nov-Mar	>48	Rippable	High	High	High.
WgC*, WgD*: Wharton	C	None	---	---	1.5-3.0	Perched	Nov-Mar	>48	Rippable	High	High	High.
Gilpin	C	None	---	---	>6.0	---	---	20-40	Rippable	Moderate	Low	High.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 17.--CLASSIFICATION OF THE SOILS

[An asterisk in the first column indicates that the soil is a taxadjunct to the series. See text for a description of those characteristics of the soil that are outside the range of the series]

Soil name	Family or higher taxonomic class
Albrights	Fine-loamy, mixed, mesic Aquic Fragiudalfs
Armagh	Clayey, mixed, mesic Typic Ochraquults
Atkins	Fine-loamy, mixed, acid, mesic Typic Fluvaquents
Berks	Loamy-skeletal, mixed, mesic Typic Dystrochrepts
Blairton	Fine-loamy, mixed, mesic Aquic Hapludults
Brinkerton	Fine-silty, mixed, mesic Typic Fragiaqualfs
Cavode	Clayey, mixed, mesic Aeric Ochraquults
Cookport	Fine-loamy, mixed, mesic Aquic Fragiudults
Ernest	Fine-loamy, mixed, mesic Aquic Fragiudults
Gilpin	Fine-loamy, mixed, mesic Typic Hapludults
Hazleton	Loamy-skeletal, mixed, mesic Typic Dystrochrepts
Laidig	Fine-loamy, mixed, mesic Typic Fragiudults
Leck Kill	Fine-loamy, mixed, mesic Typic Hapludults
*Leetonia	Sandy-skeletal, siliceous, mesic Entic Haplorthods
Nolo	Fine-loamy, mixed, mesic Typic Fragiaquults
Philo	Coarse-loamy, mixed, mesic Fluvaquentic Dystrochrepts
Pope	Coarse-loamy, mixed, mesic Fluventic Dystrochrepts
Rayne	Fine-loamy, mixed, mesic Typic Hapludults
Weikert	Loamy-skeletal, mixed, mesic Lithic Dystrochrepts
Wharton	Fine-loamy, mixed, mesic Aquic Hapludults

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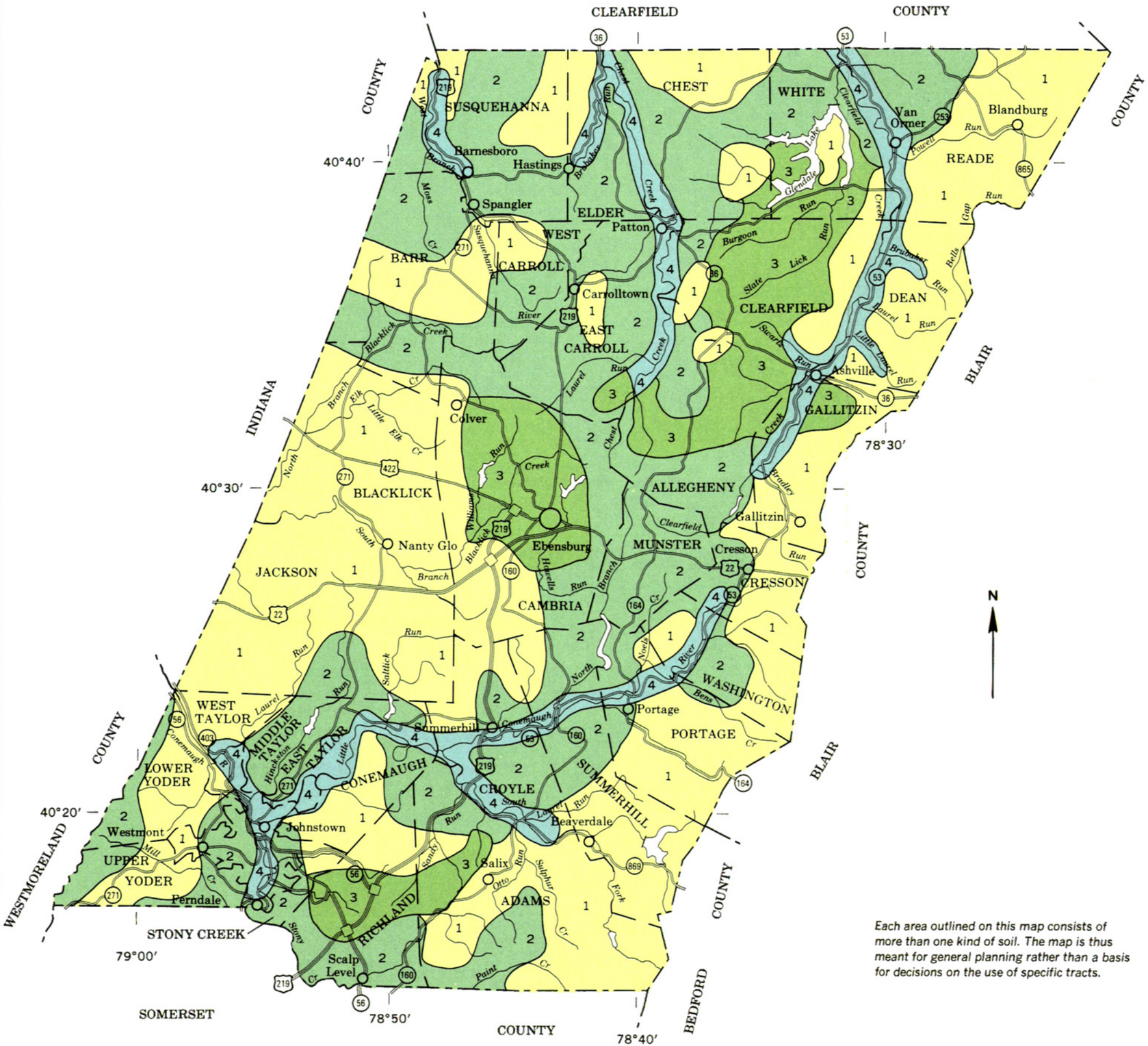


LEGEND

1 — COOKPORT-HAZLETON-LAIDIG association: Deep, nearly level to steep, moderately well drained and well drained soils that formed in residual and colluvial materials; on uplands

2 — GILPIN-ERNEST-WHARTON association: Moderately deep and deep, gently sloping to moderately steep, well drained and moderately well drained soils that formed in residual and colluvial materials; on uplands

3 — BRINKERTON-WHARTON-CAVODE association: Deep, nearly level to moderately steep, poorly drained to moderately well drained soils that formed in colluvial and residual materials; on uplands

4 — ATKINS-PHILO association: Deep, nearly level, poorly drained and moderately well drained soils that formed in alluvial material; on flood plains

COMPILED 1978

N

US DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
THE PENNSYLVANIA STATE UNIVERSITY, COLLEGE OF AGRICULTURE
AND THE PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL RESOURCES
STATE CONSERVATION COMMISSION

GENERAL SOIL MAP

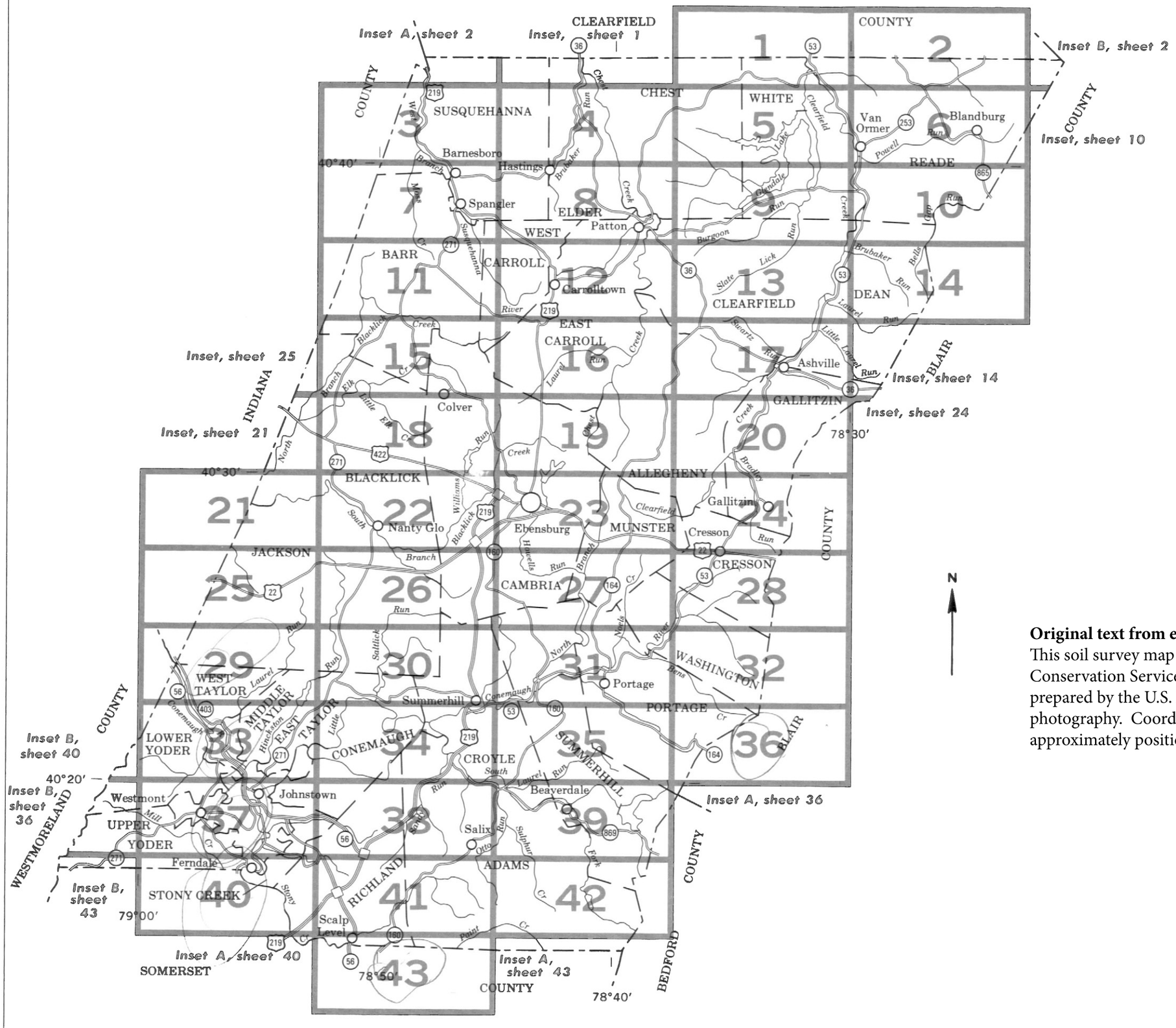
CAMBRIA COUNTY, PENNSYLVANIA

Scale 1:253,440

1 0 1 2 3 4 Miles

1 0 4 8 Km

Each area outlined on this map consists of more than one kind of soil. The map is thus meant for general planning rather than a basis for decisions on the use of specific tracts.



Original text from each individual map sheet read:
This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and Cooperating Agencies. Base Maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1977 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

INDEX TO MAP SHEETS

CAMBRIA COUNTY, PENNSYLVANIA

Scale 1:253,440

1 0 1 2 3 4 Miles

1 0 4 8 Km

SOIL LEGEND

1/ The publication symbol consists of letters. The first letter, always a capital, is the initial letter of the mapping unit name. The second letter is a capital if the mapping unit is broadly defined; otherwise, it is a small letter. The third letter, always a capital A, B, C, D, or F, indicates the slope. Most symbols without a slope letter are those of nearly level soils; however, some are for units that have considerable range of slope but have similar interpretations.

SYMBOL	NAME
AbB	Albrights silt loam, 3 to 8 percent slopes
AbC	Albrights silt loam, 8 to 15 percent slopes
AmB	Armagh silt loam, 0 to 8 percent slopes
At	Atkins silt loam
BeB	Berks channery silt loam, 3 to 8 percent slopes
BeC	Berks channery silt loam, 8 to 15 percent slopes
BeD	Berks channery silt loam, 15 to 25 percent slopes
BmB	Blairton silt loam, 3 to 8 percent slopes
BmC	Blairton silt loam, 8 to 15 percent slopes
BnB	Blairton very stony silt loam, 3 to 8 percent slopes
BpC	Blairton-Berks channery silt loams, 8 to 15 percent slopes
BtB	Brinkerton silt loam, 0 to 8 percent slopes
BvB	Brinkerton very stony silt loam, 0 to 8 percent slopes
CaA	Cavode silt loam, 0 to 3 percent slopes
CaB	Cavode silt loam, 3 to 8 percent slopes
CaC	Cavode silt loam, 8 to 15 percent slopes
CbB	Cavode very stony silt loam, 0 to 8 percent slopes
CeA	Cookport and Ernest soils, 0 to 3 percent slopes
CeB	Cookport and Ernest soils, 3 to 8 percent slopes
CeC	Cookport and Ernest soils, 8 to 15 percent slopes
CeD	Cookport and Ernest soils, 15 to 25 percent slopes
CvB	Cookport and Ernest very stony soils, 0 to 8 percent slopes
CvD	Cookport and Ernest very stony soils, 8 to 25 percent slopes
Dp	Dumps, industrial wastes
Du	Dumps, mine
GnB	Gilpin silt loam, 3 to 8 percent slopes
GpB	Gilpin very stony silt loam, 3 to 8 percent slopes
GpD	Gilpin very stony silt loam, 8 to 25 percent slopes
GtC	Gilpin-Rayne silt loams, 8 to 15 percent slopes
GtD	Gilpin-Rayne silt loams, 15 to 25 percent slopes
GwB	Gilpin-Weikert channery silt loams, 3 to 8 percent slopes
GwC	Gilpin-Weikert channery silt loams, 8 to 15 percent slopes
GwD	Gilpin-Weikert channery silt loams, 15 to 25 percent slopes
GWF	Gilpin-Weikert channery silt loams, 25 to 70 percent slopes
HaB	Hazleton channery loam, 3 to 8 percent slopes
HaC	Hazleton channery loam, 8 to 15 percent slopes
HaD	Hazleton channery loam, 15 to 25 percent slopes
HbB	Hazleton very stony loam, 3 to 8 percent slopes
HbD	Hazleton very stony loam, 8 to 25 percent slopes
Hx	Hazleton extremely bouldery sandy loam
LaB	Laidig loam, 3 to 8 percent slopes
LaC	Laidig loam, 8 to 15 percent slopes
LDF	Laidig soils, 25 to 70 percent slopes
LkB	Leck Kill silt loam, 3 to 8 percent slopes
LkC	Leck Kill silt loam, 8 to 15 percent slopes
LkD	Leck Kill silt loam, 15 to 25 percent slopes
LtB	Leetonia very stony loamy sand, 3 to 8 percent slopes
NoB	Nolo very stony sandy loam, 0 to 8 percent slopes
Ph	Philo silt loam
Po	Pope silt loam
RaB	Rayne silt loam, 3 to 8 percent slopes
RaC	Rayne silt loam, 8 to 15 percent slopes
RaD	Rayne silt loam, 15 to 25 percent slopes
UDC	Udorthents, strip mine, sloping
UDF	Udorthents, strip mine, steep
URB	Urban land-Udorthents complex, gently sloping
URC	Urban land-Udorthents complex, sloping
WaB	Wharton silt loam, 3 to 8 percent slopes
WaC	Wharton silt loam, 8 to 15 percent slopes
WgC	Wharton-Gilpin silt loams, 8 to 15 percent slopes
WgD	Wharton-Gilpin silt loams, 15 to 25 percent slopes
W	Water

CONVENTIONAL AND SPECIAL SYMBOLS LEGEND

CULTURAL FEATURES

BOUNDARIES

- National, state or province
- County or parish
- Minor civil division
- Reservation (national forest or park, state forest or park, and large airport)
- Land grant
- Limit of soil survey (label)
- Field sheet matchline & neatline
- AD HOC BOUNDARY (label) — Hedley Airstrip
- Small airport, airfield, park, oilfield, cemetery, or flood pool — POOL LINE
- STATE COORDINATE TICK
- LAND DIVISION CORNERS (sections and land grants)

ROADS

- Dividec (median shown if scale permits)
- Other roads
- Trail

ROAD EMBLEM & DESIGNATIONS

- Interstate — 21
- Federal — 173
- State — 28
- County, farm or ranch — 1283

- RAILROAD
- POWER TRANSMISSION LINE (normally not shown)
- PIPE LINE (normally not shown)
- FENCE (normally not shown)

LEVEES

- Without road
- With road
- With railroad

DAMS

- Large (to scale)
- Medium or small — water — w

PITS

- Gravel pit
- Mine or quarry

MISCELLANEOUS CULTURAL FEATURES

- Farmstead, house (omit in urban areas)
- Church
- School
- Indian mound (label) — Indian Mound
- Located object (label) — Tower
- Tank (label) — Gas
- Wells, oil or gas
- Windmill
- Kitchen midden

WATER FEATURES

DRAINAGE

- Perennial, double line
- Perennial, single line
- Intermittent
- Drainage end
- Canals or ditches
  - Double-line (label) — CANAL
  - Drainage and/or irrigation

LAKES, PONDS AND RESERVOIRS

- Perennial — water — w
- Intermittent — int — i

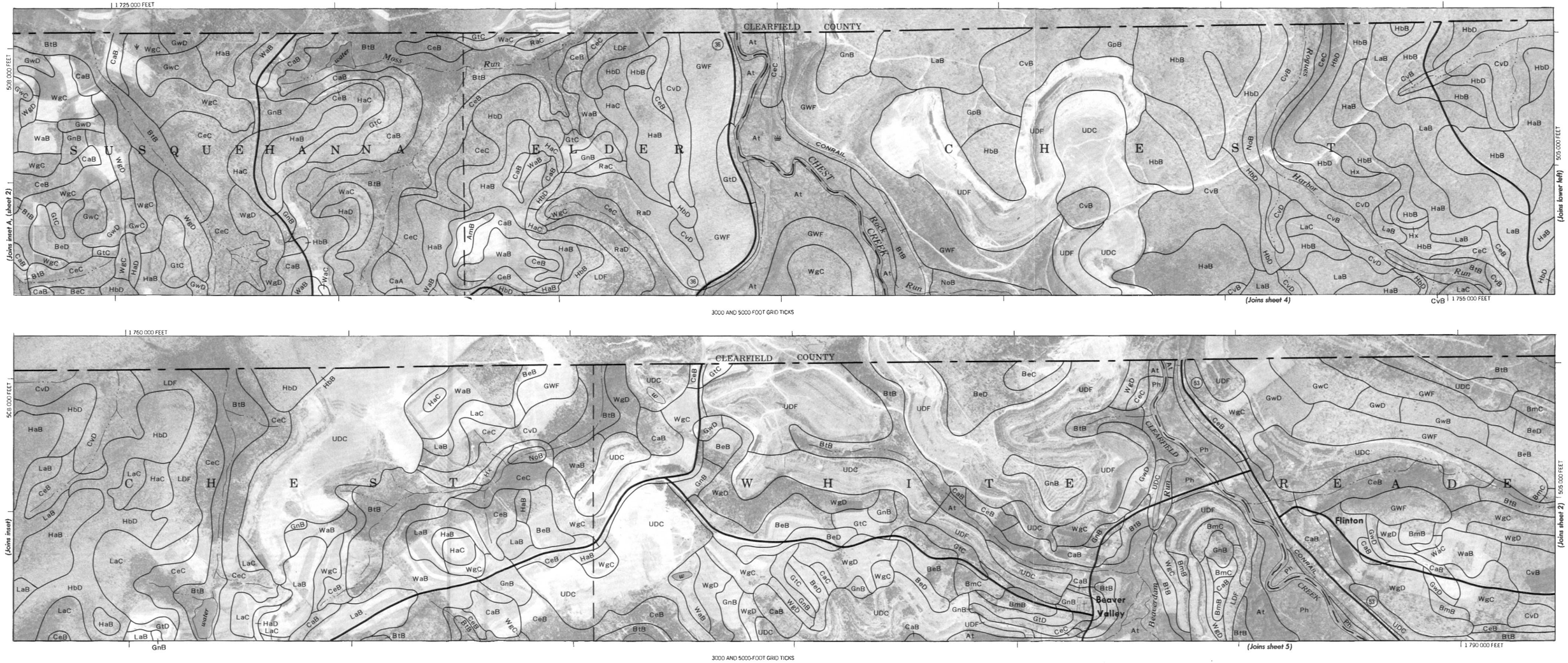
MISCELLANEOUS WATER FEATURES

- Marsh or swamp
- Spring
- Well, artesian
- Well, irrigation
- Wet spot

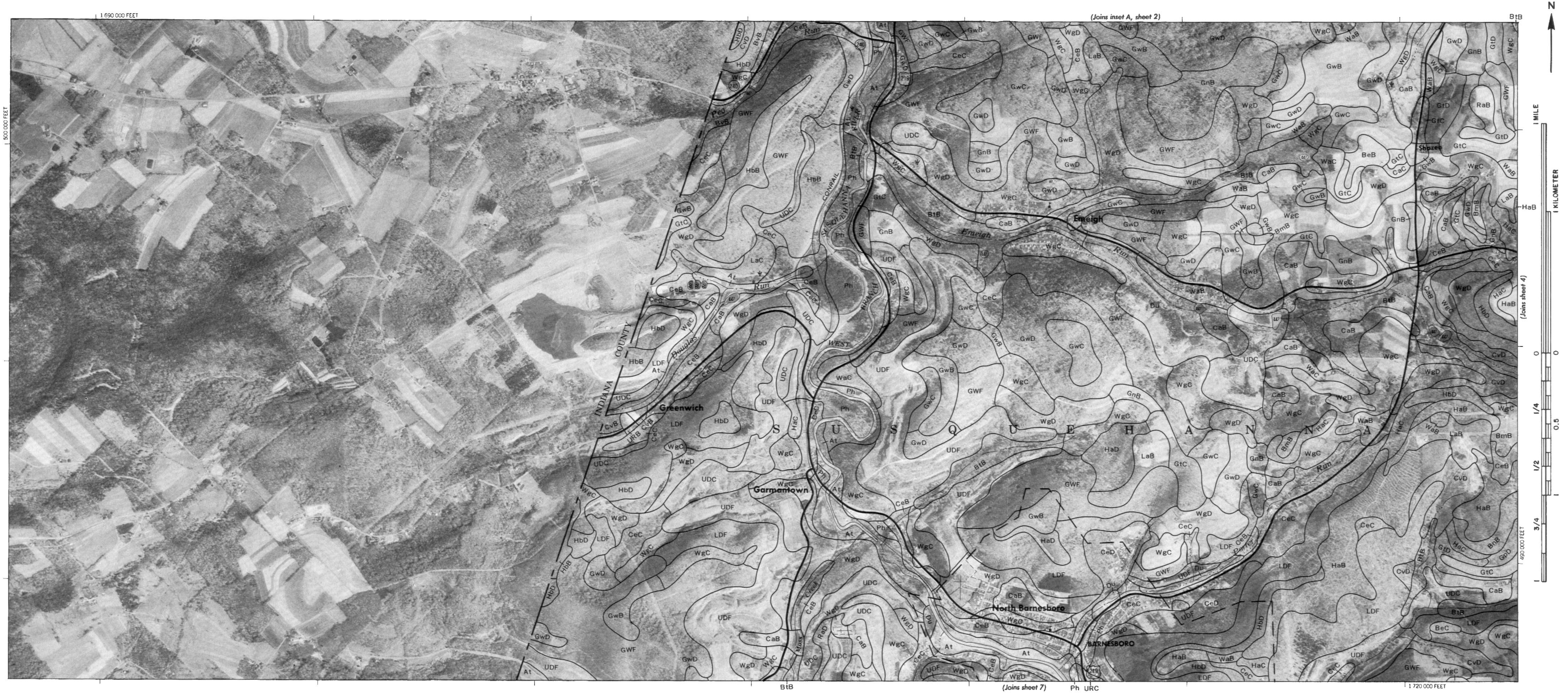
SPECIAL SYMBOLS FOR SOIL SURVEY

- SOIL DELINEATIONS AND SYMBOLS — BeC — RaB
- ESCARPMENTS
  - Bedrock (points down slope)
  - Other than bedrock (points down slope)
- SHORT STEEP SLOPE
- GULLY
- DEPRESSION OR SINK
- SOIL SAMPLE SITE (normally not shown) — S
- MISCELLANEOUS
  - Blowout
  - Clay spot
  - Gravelly spot
  - Gumbo, slick or scabby spot (sodic)
  - Dumps and other similar non soil areas
  - Prominent hill or peak
  - Rock outcrop (includes sandstone and shale)
  - Saline spot
  - Sandy spot
  - Severely eroded spot
  - Slide or slip (tips point upslope)
  - Stony spot, very stony spot — 0

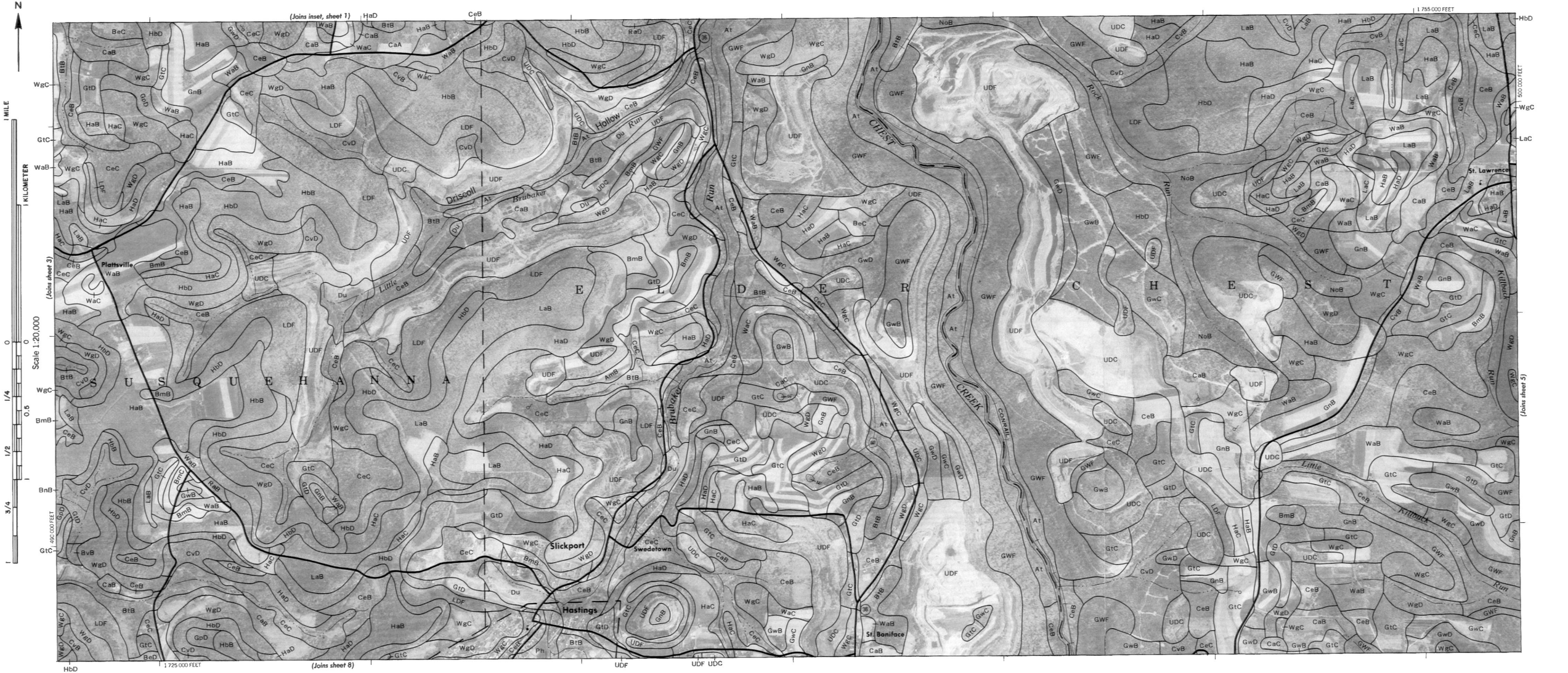
SOIL SURVEY OF CAMBRIA COUNTY, PENNSYLVANIA — SHEET NUMBER 1



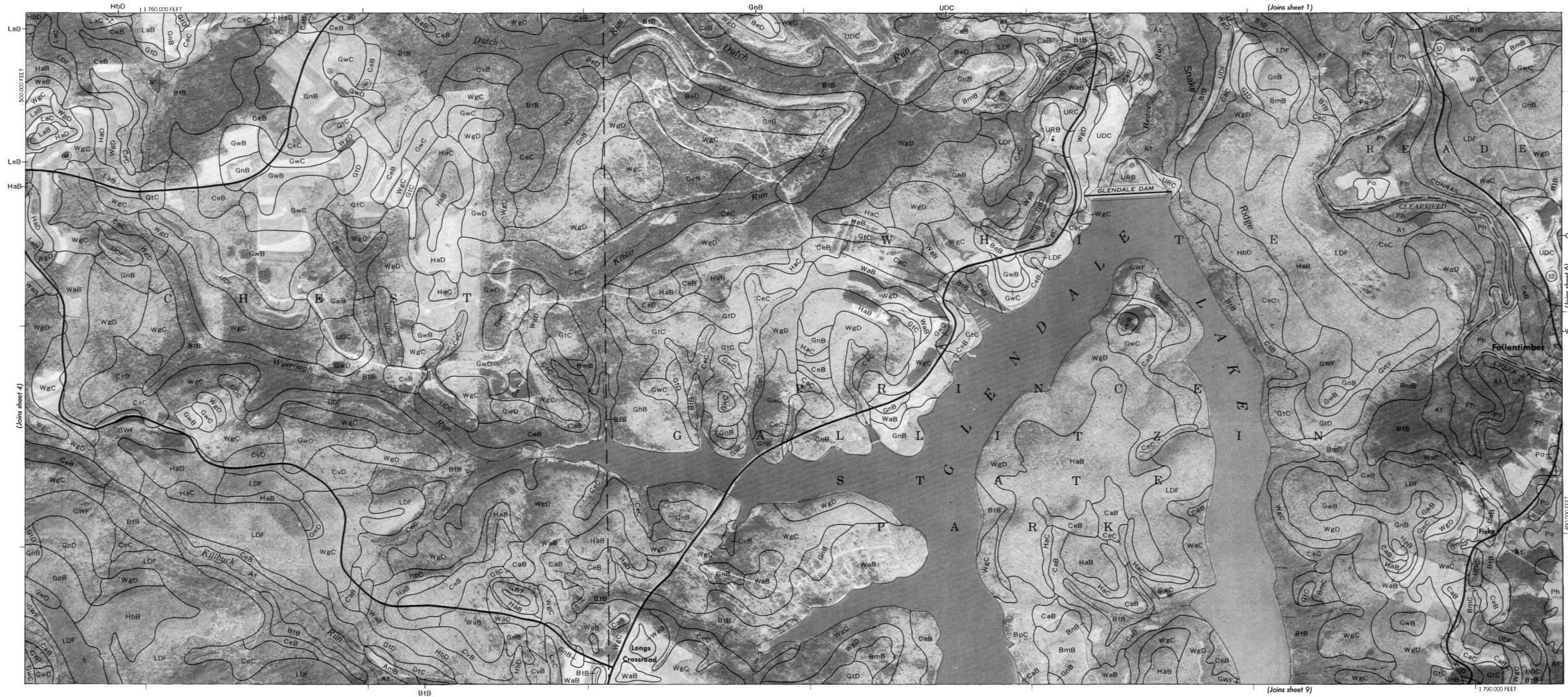

INSET A
INSET B
CLEARFIELD COUNTY
INDEFINITE BOUNDARY
INDIANA COUNTY
BLAIR COUNTY
SUSQUEHANNA
READE
1 720 000 FEET
1 705 000 FEET
1 834 000 FEET
1 830 000 FEET
1 825 000 FEET
1 795 000 FEET
505 000 FEET
508 000 FEET
515 000 FEET
520 000 FEET
(Joins sheet 3)
(Joins inset, sheet 1)
(Joins inset, sheet 10)
(Joins sheet 1)
(Joins sheet 6)
(Joins inset B)
3000 AND 5000-FOOT GRID TICKS
2000 AND 4000-FOOT GRID TICKS
Scale 1:20,000
1 MILE
1 KILOMETER
N


3
N
(Joins inset A, sheet 2)
(Joins sheet 4)
(Joins sheet 7)
1 690 000 FEET
500 000 FEET
490 000 FEET
1 720 000 FEET
1 MILE
1 KILOMETER
0
1/4
1/2
3/4
0.5
INDIANA COUNTY
Greenwich
Garmantown
Emeigh
Shazen
North Barnesboro
BARNESBORO
S U S Q U E H A N N A
WEST BRANCH
CONRAIL
Emeigh Run
Douglas Run
Peg Run
Run

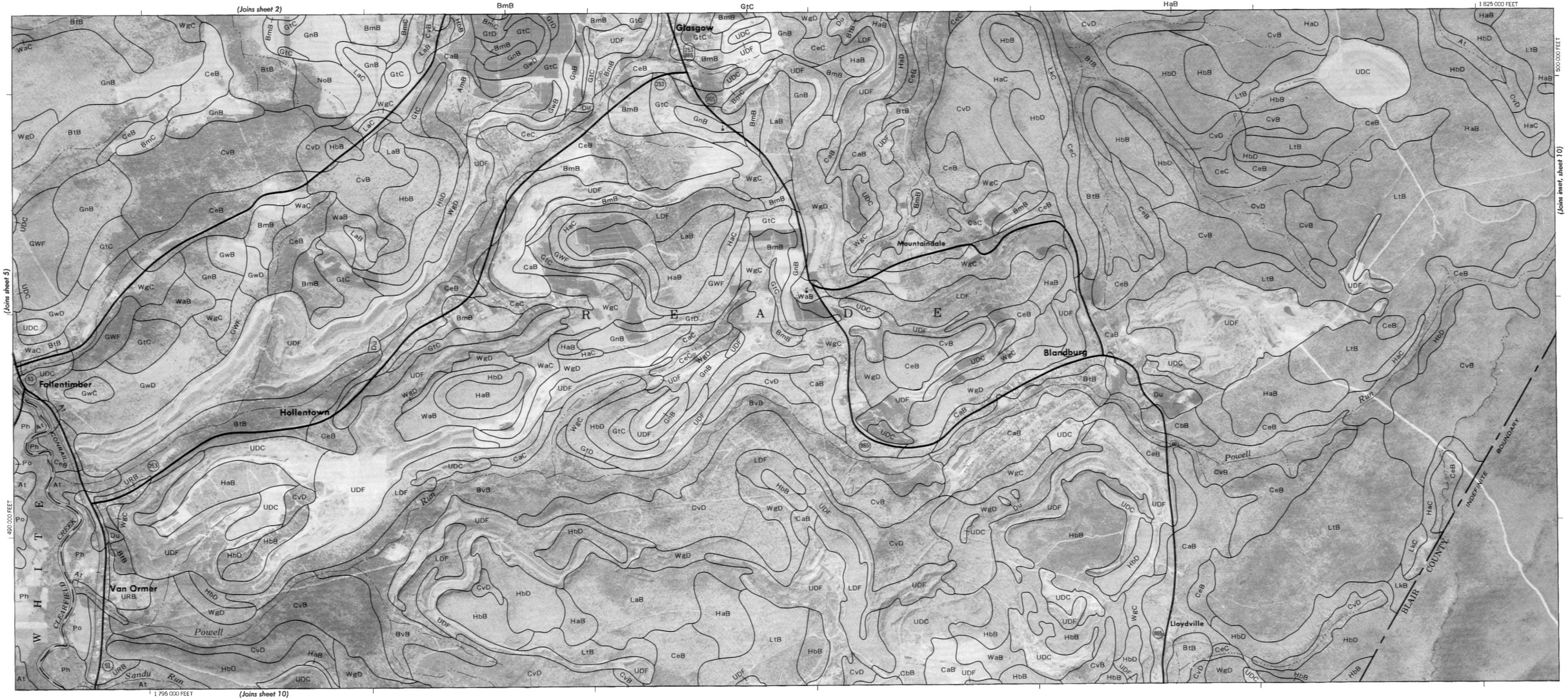
SOIL SURVEY OF CAMBRIA COUNTY, PENNSYLVANIA — SHEET NUMBER 4



SOIL SURVEY OF CAMBRIA COUNTY, PENNSYLVANIA — SHEET NUMBER 5



SOIL SURVEY OF CAMBRIA COUNTY, PENNSYLVANIA — SHEET NUMBER 6



7


(Joins sheet 3)
(Joins sheet 8)
(Joins sheet 11)
1 690 000 FEET
1 720 000 FEET
485 000 FEET
475 000 FEET
N
1 MILE
1 KILOMETER
SUSQUEHANNA
BARR
WEST CARROLL
INDIANA COUNTY
BARNESBORO
West Branch
Marsteller
Allport
SPANGLER
Watkins
Long Run
CONRAIL
SUSQUEHANNA RIVER

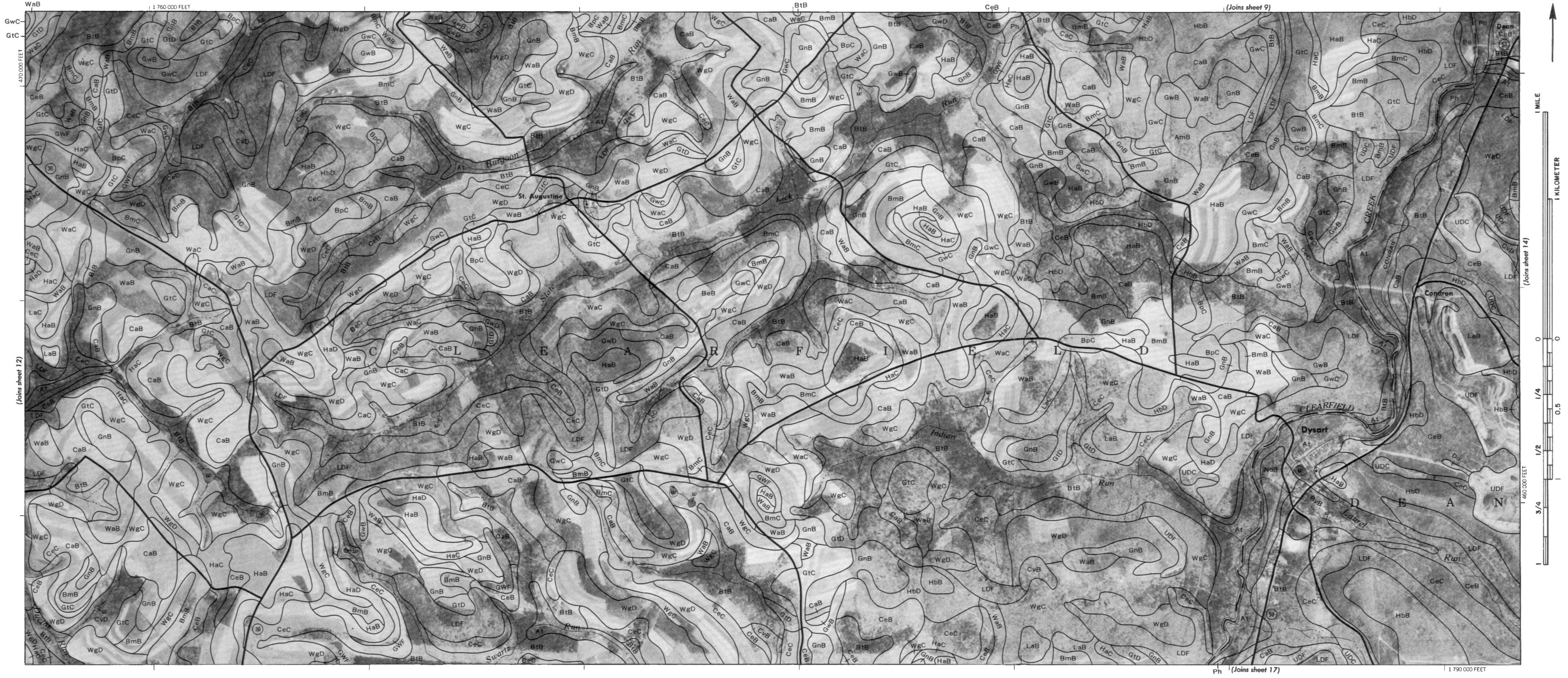

N
Scale 1:20,000
1 MILE
1 KILOMETER
0
0.5
1/4
1/2
3/4
1 755 000 FEET
1 725 000 FEET
485 000 FEET
475 000 FEET
(Joins sheet 4)
(Joins sheet 7)
(Joins sheet 9)
(Joins sheet 12)
SUSQUEHANNA
WEST CARROLL
CHEST
ELDER
CLEARFIELD
Hastings
Cymbria
St. Benedict
Patton
Reillys
Thomas Mills
Killbuck Run
Little Chest Creek
Conrail
Fox Run
Brubaker Run
Walnut Run

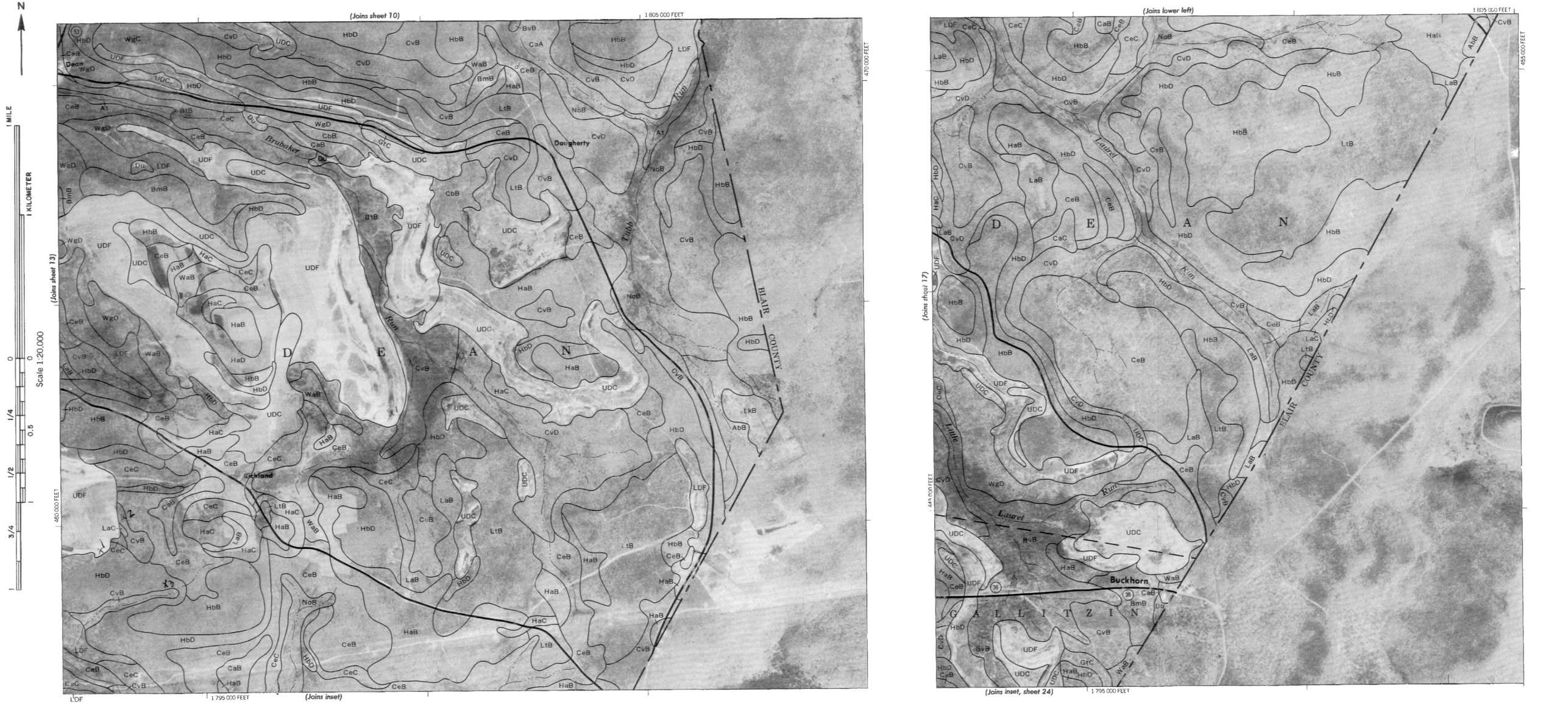

1 760 000 FEET
485 000 FEET
(Joins sheet 8)
(Joins sheet 5)
(Joins sheet 10)
(Joins sheet 13)
1 790 000 FEET
475 000 FEET
CHESTNUT
GLENDALE LAKE
GLENDALE PLATEAU
PRINCETON
DEAN
Killbuck Run
Little Killbuck Run
Beaverdam Run
Burgoon Run
Lick Run
State
Nagles Crossroad
CLEARFIELD
BOWMAN CRK
1 MILE
1 KILOMETER
N


N
1 MILE
1 KILOMETER
Scale 1:20,000
0
0
0.5
1/4
1/2
3/4
1
(Joins sheet 6)
(Joins sheet 9)
(Joins sheet 14)
1 825 000 FEET
1 795 000 FEET
485 000 FEET
475 000 FEET
WHITE
READE
DEAN
Sandy Run
Sandy Run Reservoir
Frugality
CREEK
Bear Run
Bells Gap Run
Tubb Run
BLAIR COUNTY
INDEFINITE BOUNDARY
CLEARFIELD COUNTY
(Joins inset B, sheet 2)
1 830 000 FEET
1 827 000 FEET
500 000 FEET
495 000 FEET
Lost Mountain
3000 AND 5000-FOOT GRID TICKS


N
(Joins sheet 7)
(Joins sheet 12)
(Joins sheet 15)
1 690 000 FEET
1 720 000 FEET
470 000 FEET
460 000 FEET
INDIANA COUNTY
B A R R
WEST CARROLL
Nicktown
Browns Run Reservoir
Bakerton
Barnes
Watkins
Spangler Reservoir
Blue Goose
Blacklick
1 MILE
1 KILOMETER

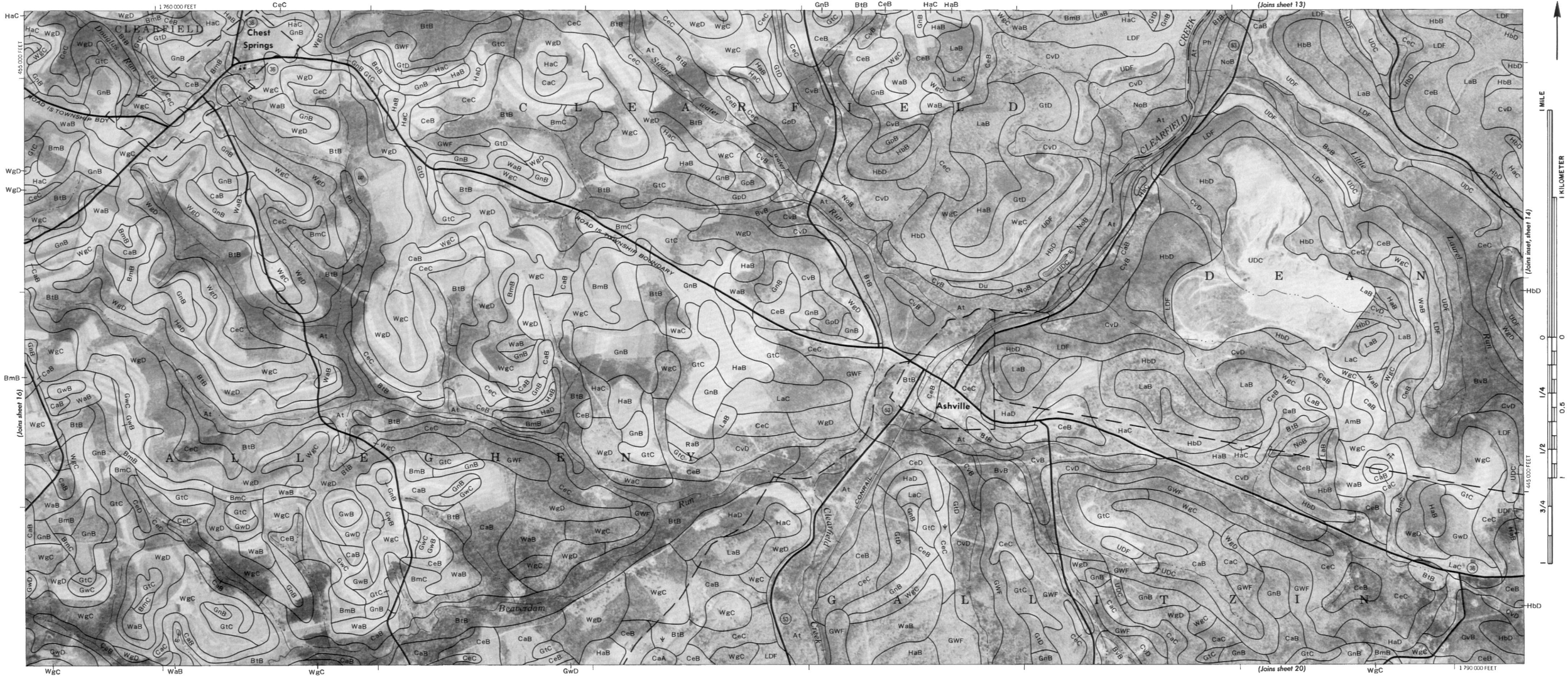

N
(Joins sheet 8)
(Joins sheet 11)
(Joins sheet 13)
(Joins sheet 16)
1 755 000 FEET
1 725 000 FEET
470 000 FEET
460 000 FEET
Scale 1:20,000
1 MILE
1 KILOMETER
Bakers Crossroad
Patton
Carrolltown
Bakerton
CARROLLTOWN AIRPORT
Eckenrode Mill
W E S T C A R R O L L
E A S T C A R R O L L
C L E A R F I E L D
A L L E G H E N Y
Susquehanna River
West Branch
Little Chest Creek
Chest Creek
Fox Run
Leslie Run
Carrolltown Reservoir
Bakerton Reservoir
CONRAIL
ROAD
TOWNSHIP BOUNDARY
219
553

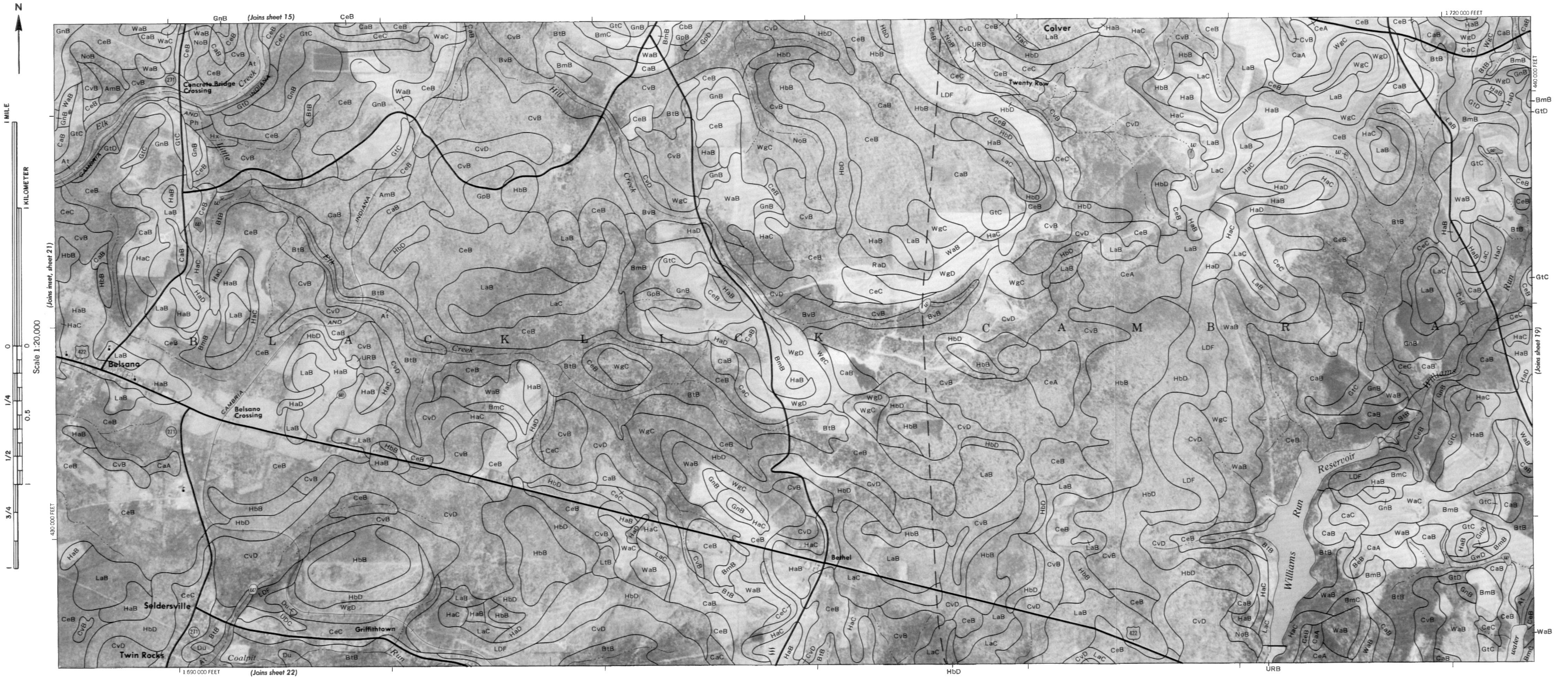

(Joins sheet 9)
(Joins sheet 12)
(Joins sheet 14)
(Joins sheet 17)
1 760 000 FEET
1 790 000 FEET
470 000 FEET
460 000 FEET
N
1 MILE
1 KILOMETER
St. Augustine
Burgoon
Run
Lick
State
C L E A R F I E L D
D E A N
Indian
Run
Dysart
Condron
Dean
CLEARFIELD
CREEK
CONRAIL
Laurel
Swartz
Run
Prave

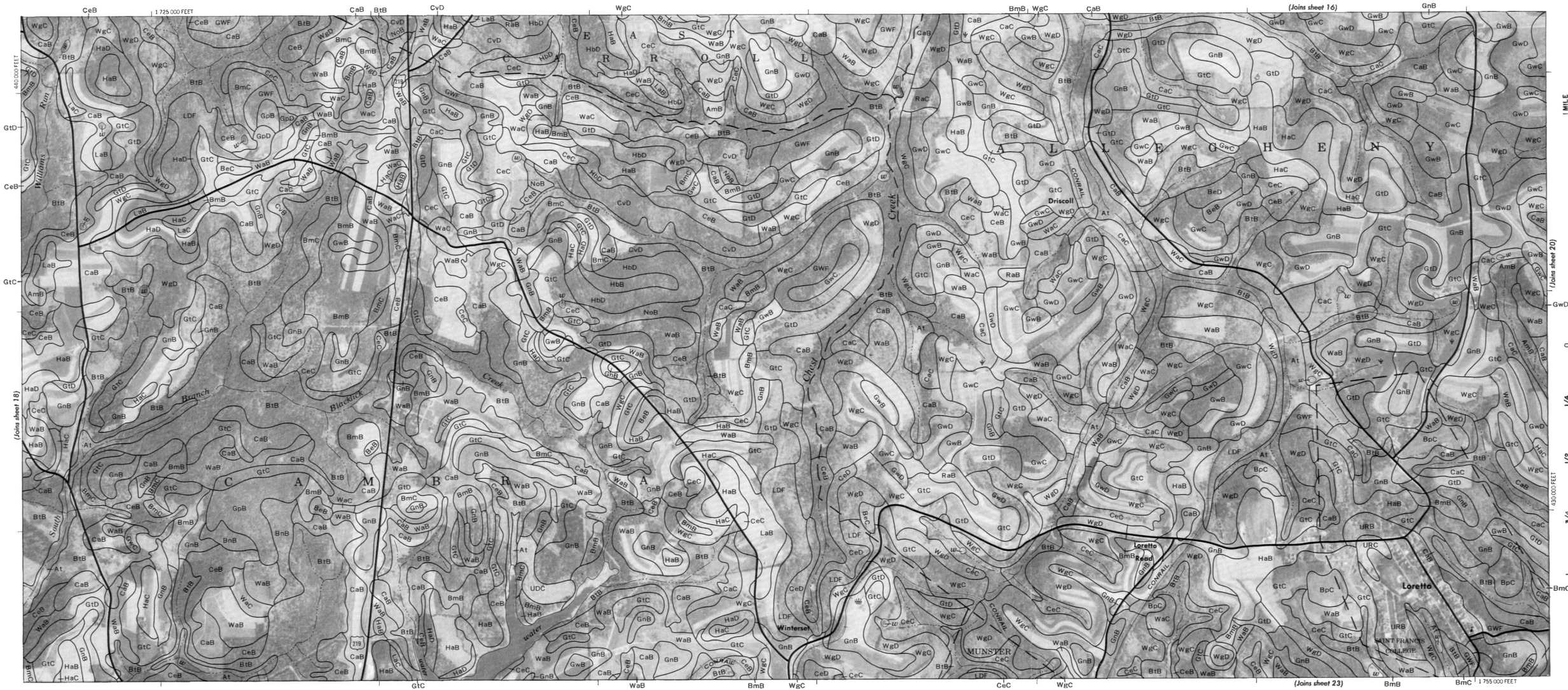

N
1 MILE
1 KILOMETER
Scale 1:20,000
(Joins sheet 10)
(Joins sheet 13)
(Joins inset)
(Joins lower left)
(Joins shaal 17)
(Joins inset, sheet 24)
1 805 000 FEET
1 795 000 FEET
470 000 FEET
460 000 FEET
455 000 FEET
445 000 FEET
Dean
Brubaker Run
Dougherty Run
Tubb Run
Laurel Run
Little Laurel Run
Buckhorn
Ackland
BLAIR COUNTY
D E A N
C A L I T Z I N


1 690 000 FEET
(Joins sheet 11)
465 000 FEET
(Joins inset, sheet 25)
(Joins sheet 16)
(Joins sheet 18)
1 720 000 FEET
445 000 FEET
INDIANA COUNTY
CAMBRIA COUNTY
CLEARFIELD COUNTY
BLACKLICK
BARR
WEST CARROLL
CAMBRIA
Dutch Run
Creek
Duman Lake
Blacklick
Colver Res.
Vetera
Branch
North
Crooked
California
Run
Hill
Creek
Elk
Creek
Preisser Crossing
Nine Row
Tripoli
Colver
Regan Junction
INDIANA
CAMBRIA
URB
1 MILE
1 KILOMETER
N


N
WEST CARROLL
EAST CARROLL
CAMBRIA
CHEST HILLS
Lonely Acres
Bradley Junction
Blacklick Creek
North Branch
Laurel Lick Run
Chest Creek
CONRAIL
water
(Joins sheet 12)
(Joins sheet 15)
(Joins sheet 17)
(Joins sheet 19)
1 755 000 FEET
1 725 000 FEET
445 000 FEET
Scale 1:20 000
1 MILE
1 KILOMETER


1 760 000 FEET
1 790 000 FEET
455 000 FEET
CLEARFIELD
Chest Springs
Ashville
CLEARFIELD CREEK
Little Laurel Run
Beaverdam Run
Clearfield Creek
ROAD IS TOWNSHIP BDY.
CLEARFIELD
CAMBRIA
ALLEGHENY
(Joins sheet 13)
(Joins sheet 16)
(Joins inset, sheet 14)
(Joins sheet 20)
N
1 MILE
1 KILOMETER


N
1 MILE
1 KILOMETER
Scale 1:20 000
0
1/4
0.5
1/2
3/4
1
(Joins sheet 15)
(Joins sheet 22)
(Joins inset, sheet 21)
(Joins sheet 19)
1 720 000 FEET
440 000 FEET
430 000 FEET
1 690 000 FEET
Colver
Twenty Row
Concrete Bridge Crossing
Belsano
Belsano Crossing
Seldersville
Griffithtown
Twin Rocks
Bethel
Elk Creek
Little Elk Creek
Hill Creek
Coalpit Run
Williams Run
Reservoir
C A M B R I A
B L A C K L I C K
INDIANA AND CAMBRIA
422
271


N
1 MILE
1 KILOMETER
0
1/4
0.5
1/2
1
3/4
1
1 725 000 FEET
1 755 000 FEET
440 000 FEET
430 000 FEET
(Joins sheet 16)
(Joins sheet 18)
(Joins sheet 20)
(Joins sheet 23)
CAMBRIA
BLACKLICK
CHEST
ALLEGHENY
Creek
Run
Branch
South
Williams
Driscoll
Loretto
Reed
Winterset
MUNSTER
SAINT FRANCIS COLLEGE
CONRAIL
219


20
N
(Joins sheet 17)
(Joins sheet 19)
(Joins sheet 24)
(Joins inset, sheet 24)
1 MILE
1 KILOMETER
Scale 1:20,000
1 760 000 FEET
1 790 000 FEET
430 000 FEET
440 000 FEET
ALLEGHENY
GALLITZIN
Spindley City
Amsbry
Coupon
Elsie
Greenfield
Syberton
Wildwood Springs
Loretta
BLAIR COUNTY
Beaverdam Run
Clearfield Creek
Conrail
Bradley Run

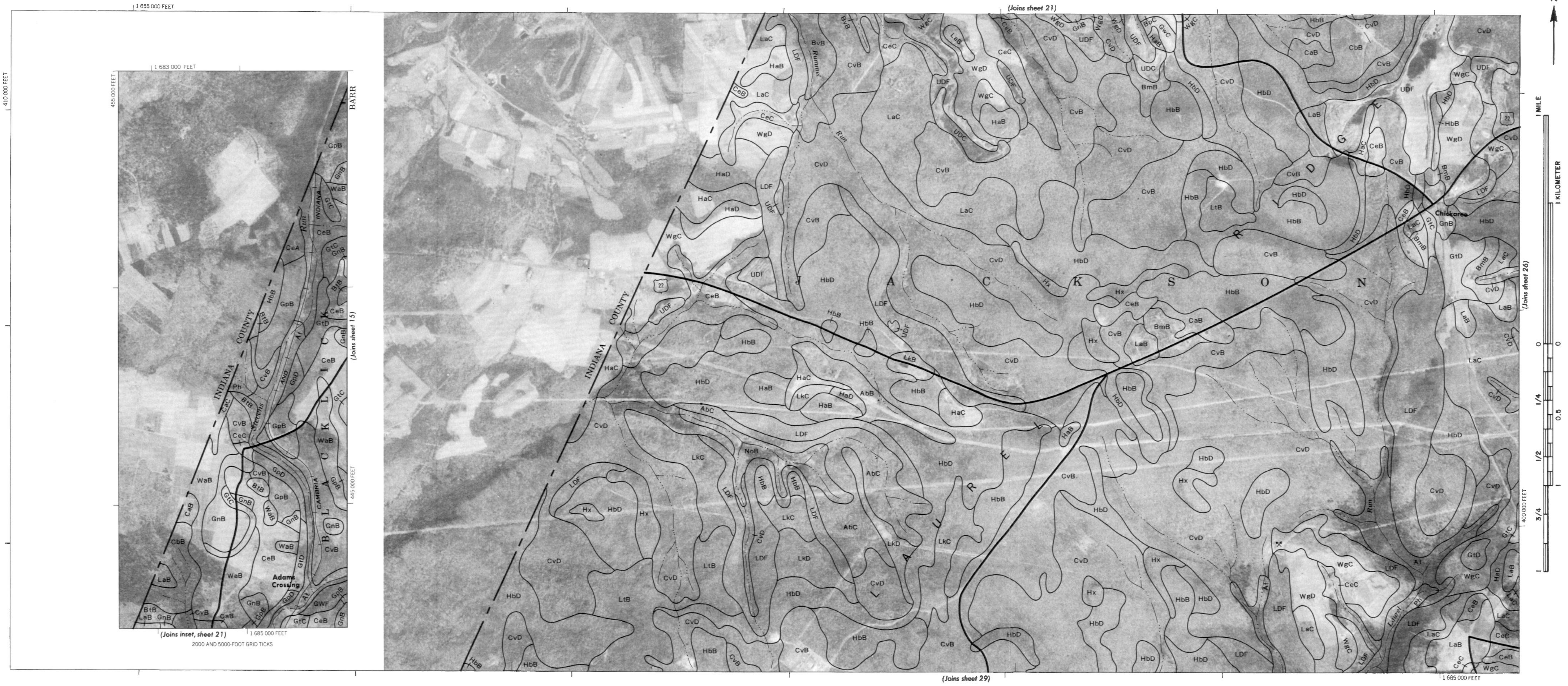

1 680 000 FEET
(Joins inset, sheet 25)
440 000 FEET
Charlies Grove
422
White Mill Crossing
Creek
BLACKLICK
Simmons
Run
(Joins sheet 18)
Red Mill
INDIANA COUNTY
B L A C K L I C K
CAMBRIA
NORTH
Walker
Run
430 000 FEET
(Joins upper right)
1 685 000 FEET


21
N
1 670 000 FEET
(Joins inset)
425 000 FEET
B L A C K L I C K
BR
BLACKLICK
CR
INDEFINITE BOUNDARY
INDIANA COUNTY
Vintondale
SOUTH
Bracken
Run
Shuman
Run
J A C K S O N
(Joins sheet 22)
415 000 FEET
(Joins sheet 25)
1 685 000 FEET
1 MILE
1 KILOMETER
0
1/4
1/2
3/4
0.5


N
1 MILE
1 KILOMETER
Scale 1:20 000
(Joins sheet 18)
(Joins sheet 21)
(Joins sheet 23)
(Joins sheet 26)
1 720 000 FEET
425 000 FEET
415 000 FEET
1 690 000 FEET
Twin Rocks
Cardiff
Revloc
Beula
NANTY GLO
EBENSBURG CENTER
EBENSBURG AIRPORT
JACKSON
B L A C K L I C K
J A C K S O N
C A M B R I A
South Branch Blacklick Creek
Blacklick Creek
Williams Run
CONRAIL
INDIANA AND CAMBRIA
water


(Joins sheet 19)
(Joins sheet 22)
(Joins sheet 24)
(Joins sheet 27)
1 725 000 FEET
1 755 000 FEET
425 000 FEET
415 000 FEET
N
1 MILE
1 KILOMETER
1/4
1/2
3/4
0.5
0
EBENSBURG
Mylo Park
Lovell Park
Loretto
Ebensburg Junction
Kaylor
Noel
Munster
City Reservoir
Lake Rowena
Hollow
Kaylor Branch
North Branch
Clearfield Creek
CONRAIL
CAMBRIA AND INDIANA
A L L E G H E N Y
C A M B R I A
M U N S T E R


N
Scale 1:20,000
1 MILE
1 KILOMETER
0
0
1/4
0.5
1/2
1
3/4
(Joins sheet 20)
(Joins sheet 23)
(Joins sheet 28)
1 790 000 FEET
420 000 FEET
415 000 FEET
1 760 000 FEET
ALLEGHENY
GALLITZIN
MUNSTER
CRESSON
Sankertown
Haguetown
Lucket
Pine Grove
Clearfield
Creek
Lake
Bradley
Run
Tunnelhill
BLAIR COUNTY
CONRAIL
MOUNT ALOYSIUS JR. COLLEGE
(Joins inset, sheet 14)
GALLITZIN
BLAIR
COUNTY
Tunnelhill
1 795 000 FEET
1 792 000 FEET
1000 AND 2000-FOOT GRID TICKS


(Joins sheet 21)
(Joins sheet 26)
(Joins sheet 29)
(Joins sheet 15)
(Joins inset, sheet 21)
1 655 000 FEET
1 683 000 FEET
1 685 000 FEET
410 000 FEET
455 000 FEET
445 000 FEET
400 000 FEET
2000 AND 5000-FOOT GRID TICKS
N
1 MILE
1 KILOMETER
0
1/4
1/2
3/4
0.5
INDIANA COUNTY
CAMBRIA
BARR
BLACKLICK
JACKSON
LAUREL RIDGE
Chickaree
Adams Crossing
Stevens
Rummel Run
Laurel Run
22


26
N
(Joins sheet 22)
BLACKLICK
1 720 000 FEET
410 000 FEET
NANTY GLO
Mundys Corner
CONRAIL
Stewart
Run
water
CAMBRIA
SOMERSET
CROYLE
SUMMERHILL
(Joins sheet 25)
(Joins sheet 27)
(Joins sheet 30)
1 690 000 FEET
400 000 FEET
1 MILE
1 KILOMETER
Scale 1:20,000
1/4
1/2
3/4
0.5
1
0


(Joins sheet 23)
(Joins sheet 26)
(Joins sheet 28)
(Joins sheet 31)
1 725 000 FEET
1 755 000 FEET
410 000 FEET
400 000 FEET
N
1 MILE
1 KILOMETER
0
1/4
1/2
3/4
0.5
C A M B R I A
M U N S T E R
C R E S S O N
W A S H I N G T O N
P O R T A G E
S U M M E R H I L L
Howells Run
Roaring Run
Sanders Run
North Branch
Noels Creek
water
Lilly
Upper Dutchtown
Lower Dutchtown


N
(Joins sheet 24)
(Joins sheet 27)
(Joins sheet 32)
1 760 000 FEET
1 790 000 FEET
400 000 FEET
Scale 1:20,000
1 MILE
1 KILOMETER
Cresson
Summit
MUNSTER
Dysertown
Lilly
CRESSON
WASHINGTON
Conemaugh River
Little Conemaugh
CONRAIL
Burgoon Run
Bear Rock Run
Christie Hollow
Adams Gap
Laurel Gap
BLAIR COUNTY
INDEFINITE BOUNDARY


1 655 000 FEET
(Joins sheet 25)
395 000 FEET
INDIANA COUNTY
WESTMORELAND COUNTY
Rager Mountain
W E S T T A Y L O R
J A C K S O N
MIDDLE TAYLOR
EAST TAYLOR
LOWER YODER
LAUREL
Conemaugh Gorge
CONRAIL
CONRAIL RIPPER
Wildcat Run
Red Run
Laurel Run
Laurel Run Reservoir
Hinckston Run Reservoir
(Joins sheet 30)
(Joins sheet 33)
1 685 000 FEET
N
1 MILE
1 KILOMETER


N
Scale 1:20,000
1 MILE
1 KILOMETER
0
0
1/4
0.5
1/2
1
3/4
(Joins sheet 29)
(Joins sheet 26)
(Joins sheet 31)
(Joins sheet 34)
1 720 000 FEET
1 690 000 FEET
395 000 FEET
385 000 FEET
JACKSON
CROYLE
EASTTAYLOR
MIDDLE TAYLOR
Vinco
Wesley Chapel
West Point
Mineral Point
Echo
New Germany
Ehrenfeld
Summerhill
SUMMERHILL
Saltlick Reservoir
Saltlick Run
Little Run
Custer Run
Hinckston Run
Conemaugh River
CONEMAUGH
CONRAIL


1 725 000 FEET
1 395 000 FEET
1 755 000 FEET
385 000 FEET
(Joins sheet 27)
(Joins sheet 30)
(Joins sheet 32)
(Joins sheet 35)
SUMMERHILL
ROYLE
WASHINGTON
PORTAGE
CADOGAN
Wilmore
Wilmore Heights
Jamestown
Sonman
Moody Hill
Spring Hill
Redbird
Miller Shaft
Oil City
Cassandra
Moshannon
Plane Bank
Scarlan Hill
Bens Creek
Shoemaker
WILMORE DAM
CONEMAUGH RIVER
LITTLE CONEMAUGH
North Branch
Little Conemaugh
Trout Run
Spring Run
CONRAIL
1 MILE
1 KILOMETER
N


N
Lilly
(Joins sheet 28)
1 790 000 FEET
395 000 FEET
CRESSON
WASHINGTON
PORTAGE
Lilly Res
Rock Run
Big Spring Gap
Dividing Creek
Burns Hollow
INDEFINITE BOUNDARY
BLAIR COUNTY
(Joins sheet 31)
385 000 FEET
1 760 000 FEET
(Joins sheet 36)
1 MILE
1 KILOMETER
Scale 1:20,000


(Joins sheet 29)
1 655 000 FEET
380 000 FEET
WEST TAYLOR
MIDDLE TAYLOR
EAST TAYLOR
LOWER YODER
WESTMORELAND COUNTY
INDEFINITE BOUNDARY
LAUREL HILL
Conemaugh Gorge
CONRAIL
Tanneryville
Oakhurst
Coopersdale
Pleasant Hill
Morrelville
Minersville
Cambria City
Brownstown
JOHNSTOWN
Prospect
Woodvale
EAST CONEMAUGH
Franklin
Parkhill
Goods Corner
Hinckston Run Reservoir
Strayer Run
Laurel Run
Wildcat Run
Hinckston Run
Peggys Run
CONEMAUGH RIVER
BLACKLICK
(Joins inset B, sheet 40)
(Joins sheet 34)
(Joins sheet 37)
WESTMONT
370 000 FEET
1 685 000 FEET
1 MILE
1 KILOMETER
N

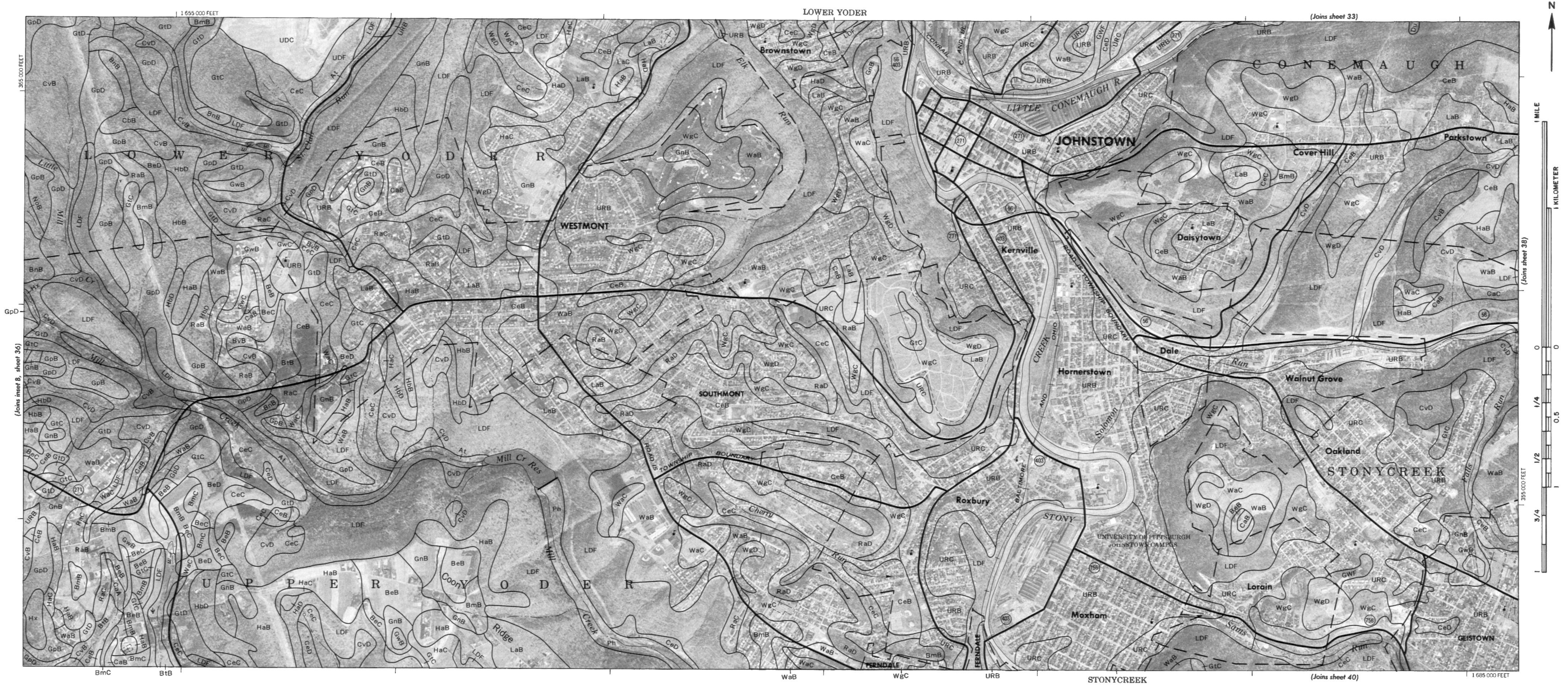

N
Scale 1:20,000
1 MILE
1 KILOMETER
(Joins sheet 30)
(Joins sheet 33)
(Joins sheet 35)
(Joins sheet 38)
1 720 000 FEET
1 690 000 FEET
1 380 000 FEET
1 370 000 FEET
EAST TAYLOR
CROYLE
CONEMAUGH
CLOVER
ADAMS
RICHLAND
Echo
Parkhill
Newtown
Wissinger Town
Bon Air
South Fork
Rockville
Ehrenfeld
Summerhill
Soukesburg
Fishertown
St. Michael
CONRAIL
RIVER
Run
Branch
Creek

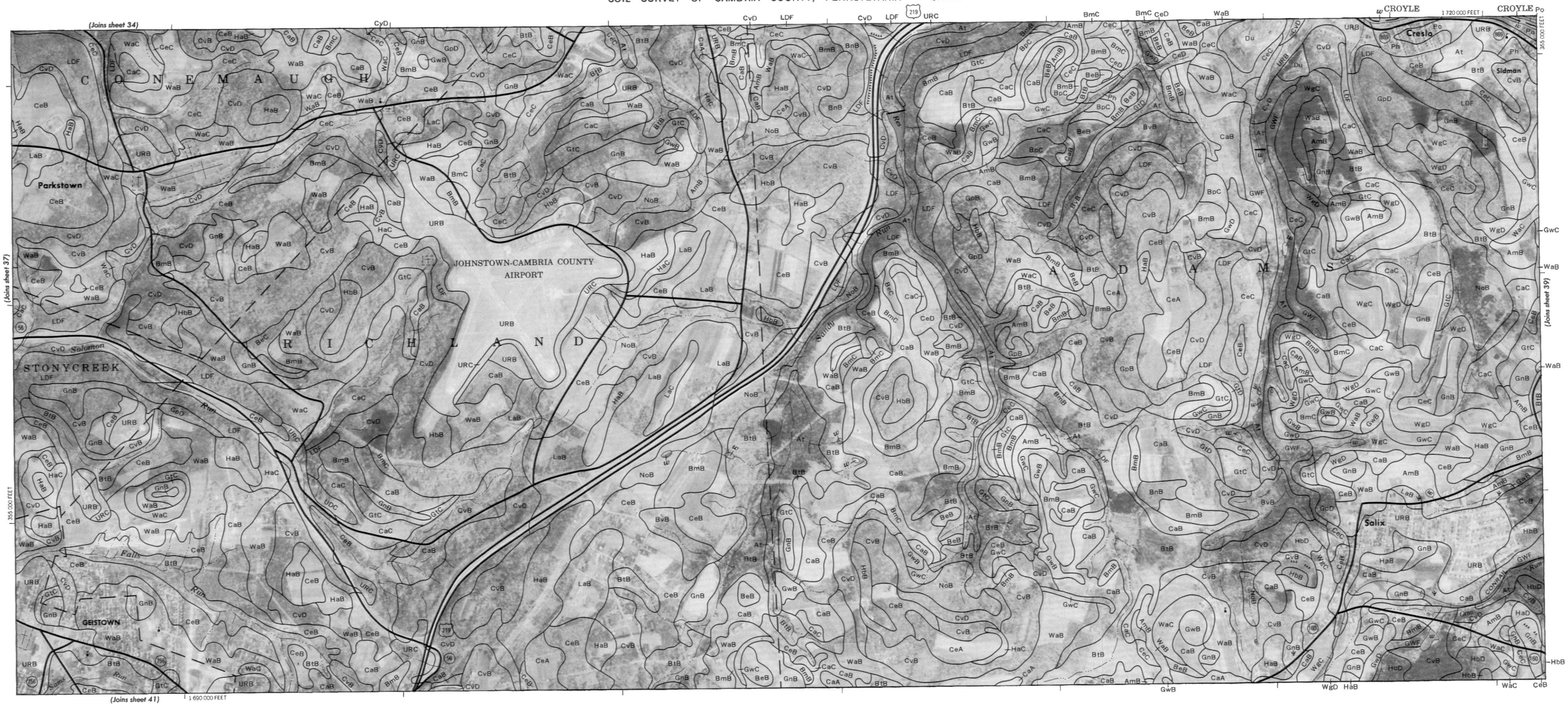

N
1 MILE
1 KILOMETER
1 725 000 FEET
1 755 000 FEET
380 000 FEET
370 000 FEET
(Joins sheet 31)
(Joins sheet 34)
(Joins sheet 36)
(Joins sheet 39)
Fiddlers Green
Spring Hill
Germantown
Puritan
Martindale
CROYLE
SUMMERHILL
PORTAGE
Laurel Run
Birch Run
Mud Run
Kamp Run


N
1 MILE
1 KILOMETER
Scale 1:20,000
(Joins sheet 32)
1 770 000 FEET
380 000 FEET
WASHINGTON
PORTAGE
Bobs Creek Gap
Bobs Creek
Dividing Hollow
INDEFINITE BOUNDARY
BLAIR COUNTY
Portage Reservoir
(Joins sheet 35)
370 000 FEET
1 760 000 FEET
(Joins inset A,
INSET A
(Joins lower left)
1 758 000 FEET
365 000 FEET
(Joins sheet 39)
361 000 FEET
1 757 000 FEET
SUMMERHILL
BEDFORD COUNTY
1000 AND 4000-FOOT GRID TICKS

INSET B

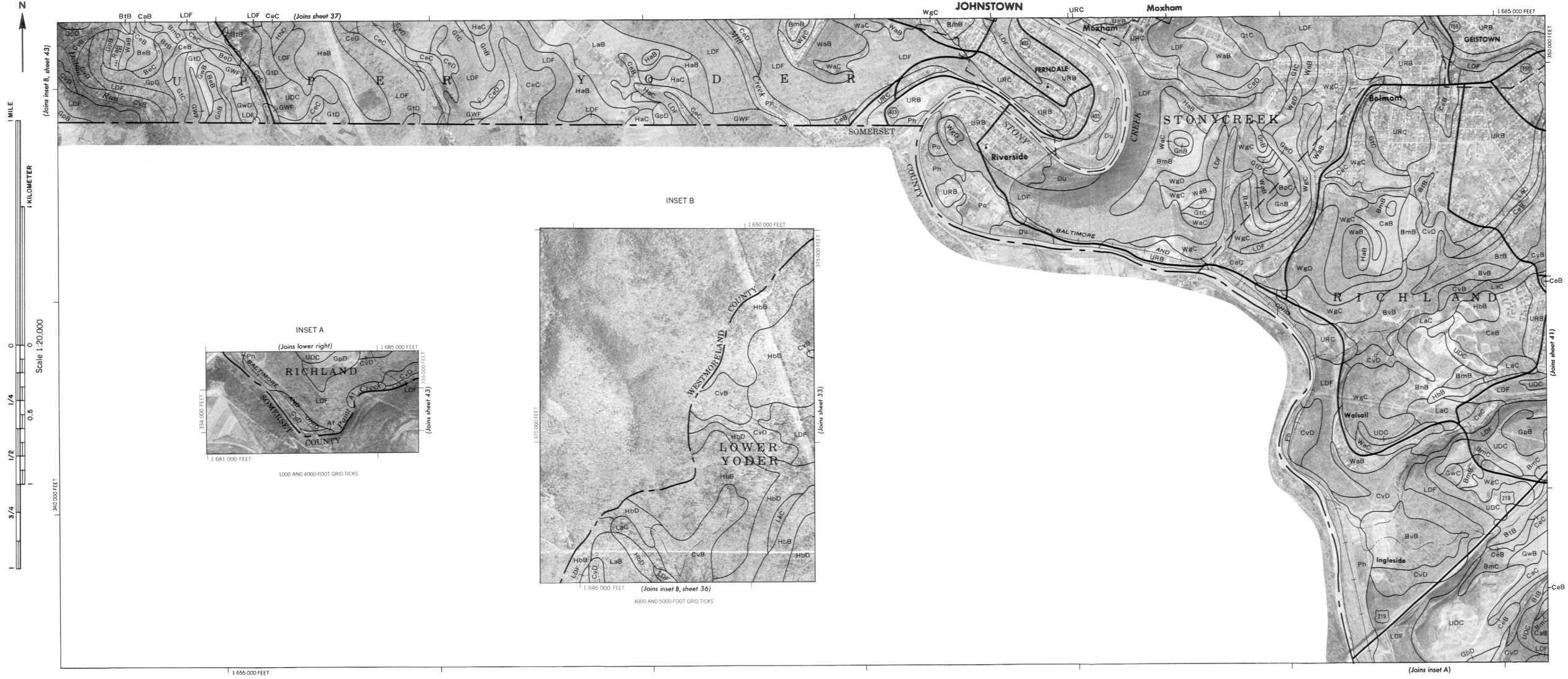

(Joins lower inset B, sheet 40)
1 650 000 FEET
365 000 FEET
LOWER YODER
WESTMORELAND COUNTY
Mill Creek
Little Mill Creek
UPPER YODER
Quemahoning
(Joins sheet 37)
355 000 FEET
1 640 000 FEET
(Joins upper inset B, sheet 43)


LOWER YODER
(Joins sheet 33)
1 655 000 FEET
365 000 FEET
N
1 MILE
1 KILOMETER
(Joins sheet 38)
(Joins inset 8, sheet 36)
(Joins sheet 40)
1 685 000 FEET
355 000 FEET
STONYCREEK
LOWER YODER
UPPER YODER
CONEMAUGH
STONYCREEK
JOHNSTOWN
WESTMONT
SOUTHMONT
Brownstown
Kernville
Daisytown
Cover Hill
Parkstown
Dale
Hornerstown
Walnut Grove
Oakland
Roxbury
Moxham
Lorain
GEISTOWN
FERNDALE
UNIVERSITY OF PITTSBURGH
JOHNSTOWN CAMPUS
LITTLE CONEMAUGH R
STONY CREEK
Elk Run
Mill Creek
Mill Cr Res
Cherry Run
Solomon Run
Sams Run
Little Mill Cr
Coony Ridge
Paint Creek
St Clair Run
Falls Run
ROAD IS TOWNSHIP BOUNDARY
CONRAIL
BALTIMORE AND OHIO
271
403
56
756


N
(Joins sheet 34)
CONEMAUGH
Parkstown
JOHNSTOWN-CAMBRIA COUNTY AIRPORT
RICHLAND
STONYCREEK
GEISTOWN
ADAMS
CROYLE
Creslo
Sidman
Salix
(Joins sheet 37)
(Joins sheet 39)
(Joins sheet 41)
1 720 000 FEET
1 690 000 FEET
365 000 FEET
1 MILE
1 KILOMETER
Scale 1:20,000

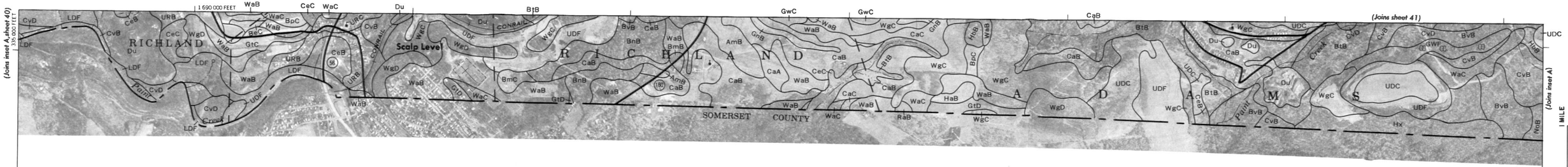

1 725 000 FEET
(Joins sheet 35)
(Joins inset A, sheet 36)
(Joins sheet 38)
(Joins sheet 42)
1 755 000 FEET
355 000 FEET
CROYLE
SUMMERHILL
ADAMS
Sidman
Allendale
Beaverdale
Lloydell
Onnalinda
Dunlo
PORTAGE
BEDFORD
COUNTY
INDEFINITE BOUNDARY
Laurel Run
Beaverdam Run
Cedar Run
Big Run
Little Conemaugh
South Fork
Otto Run
Sulphur Run
Shoemaker Run
Creek
water
CONRAIL
N
1 MILE
1 KILOMETER
0
1/4
0.5
1/2
3/4

SOIL SURVEY OF CAMBRIA COUNTY, PENNSYLVANIA — SHEET NUMBER 40

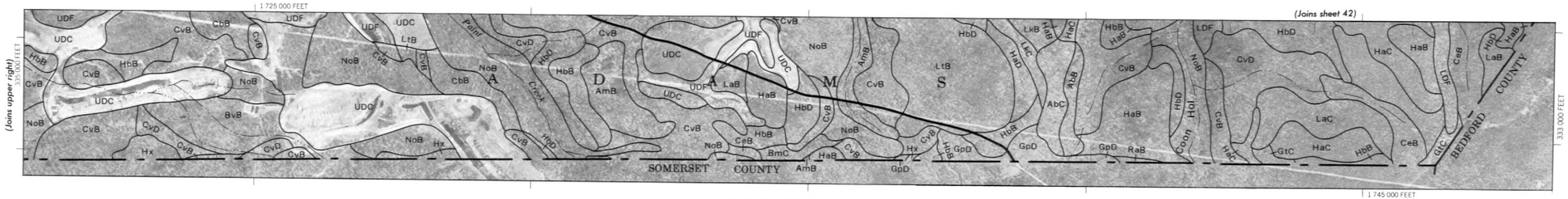



N
GEISTOWN
Elton
CONRAIL
Little Paint Creek
Paint Creek
Scalp Level
Number 37
RICHLAND
ADAMS
1 690 000 FEET
1 720 000 FEET
360 000 FEET
350 000 FEET
(Joins sheet 38)
(Joins sheet 40)
(Joins sheet 42)
(Joins sheet 43)
1 MILE
1 KILOMETER

SOIL SURVEY OF CAMBRIA COUNTY, PENNSYLVANIA — SHEET NUMBER 42

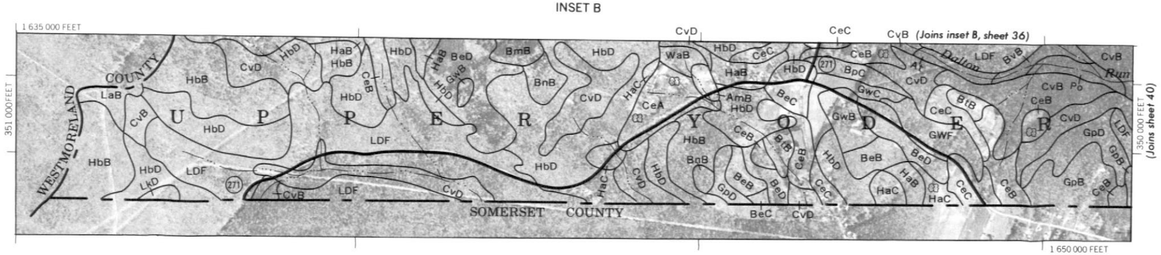


INSET A



2000 AND 5000-FOOT GRID TICKS

INSET B



1000 AND 5000-FOOT GRID TICKS

1 720 000 FEET

N

1 MILE
1 KILOMETER
0
0
1/4
0.5
1/2
1
3/4
1